

In Re Application Of: **Takako ADACHI and Makoto SHIOMI**

Serial No.	Filing Date	Examiner	Group Art Unit
09/820,021	28 March 2001	Zamani, Ali A.	2674

Invention:

**LIQUID CRYSTAL DISPLAY DEVICE**

Attention: Office of Petitions  
COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, VA 22313-1450

NOTE: If information or assistance is needed in completing this form, please contact Petitions Information at (703) 305-9282.

The above-identified application became abandoned for failure to file a timely and proper response to a notice or action by the Patent and Trademark Office. The date of abandonment is the day after the expiration date of the period set for reply in the Office notice or action plus any extension of time actually obtained.

**APPLICANT HEREBY PETITIONS FOR REVIVAL OF THIS APPLICATION**

NOTE: A grantable petition requires the following items:

- (1) Petition fee;
- (2) Reply and/or issue fee;
- (3) Terminal disclaimer with disclaimer fee--required for all utility and plant applications filed before June 8, 1995; and for all design applications; and
- (4) Statement that the entire delay was unintentional.

1.  A proposed reply to the above-identified notice or action:

is enclosed.  was filed on \_\_\_\_\_

The proposed reply is in the form of: Continuation Application

2.  The issue fee:

is enclosed.  was paid on \_\_\_\_\_

3.  The abandoned application was a:

design application.  utility application.  plant application.

4.  A terminal disclaimer (and fee) disclaiming a period equivalent to the period of abandonment is enclosed.

5.  Since this utility/plant application was filed on or after June 8, 1995, no terminal disclaimer is required.

Petition For Revival Of An Application For Patent Abandoned  
Unintentionally Under 37 CFR 1.137(b) (Large Entity)

Docket No.

55750 (45672)

COPY

In Re Application Of: **Takako ADACHI and Makoto SHIOMI**

Serial No.

09/820,021

Filing Date

28 March 2001

Examiner

Zamani, Ali A.

Group Art Unit

2674

Invention:

**LIQUID CRYSTAL DISPLAY DEVICE**

**Calculation and Payment of Fees**

Enclosed are the following fees:

6.  Petition fee under 37 CFR 1.17(m) in the amount of: \$1,300.00

7.  Fee for amendment in the amount of: \_\_\_\_\_

8.  Fee for extension of time to respond to Office Action in the amount of: \_\_\_\_\_

9.  Issue fee in the amount of: \_\_\_\_\_

10.  Continuing application filing fee in the amount of: \$750.00

11.  Terminal disclaimer fee in the amount of: \_\_\_\_\_

12.  \_\_\_\_\_

Total fees enclosed: \$2,050.00

The fee of \$2,050 is to be paid as follows:

A check in the amount of the fee is enclosed.

The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account No. 04-1105

Petition For Revival Of An Application For Patent Abandoned  
Unintentionally Under 37 CFR 1.137(b) (Large Entity)

**COPY** Docket No.  
55750 (45672)

In Re Application Of: **Takak ADACHI and Makoto SHIOMI**

Serial No. <b>09/820,021</b>	Filing Date <b>28 March 2001</b>	Examiner <b>Zamani, Ali A.</b>	Group Art Unit <b>2674</b>
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Invention:

**LIQUID CRYSTAL DISPLAY DEVICE**

**Statement**

The entire delay in filing the required reply from the due date for the required reply until the filing of a grantable petition under 37 CFR 1.137(b) was unintentional.

**In addition, please note the Supplemental Statement attached.**

David A. Tucker  
Signature

Dated: **July 18, 2003**

David A. Tucker  
Reg. No. 27,840  
Attorney for Applicant  
Edwards & Angell, LLP  
P.O. Box 9169  
Boston, MA 02209  
Telephone (617) 517-5508



**21874**

PATENT TRADEMARK OFFICE

CC:



# COPY

Practitioner's Docket No. 55750 (45672)  
PATENT

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: T. Adachi, et al.  
Application No.: 09/820,021 Group No.: 2871  
Filed: March 28, 2001 Examiner: Unknown  
For: LIQUID CRYSTAL DISPLAY DEVICE

**Mail Stop: NO FEE AMENDMENT**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

### AMENDMENT TRANSMITTAL

1. Transmitted herewith is a Request for Reconsideration for this application.

### STATUS

2. Applicant is  
 a small entity. A statement:  
 is attached.  
 was already filed.  
 other than a small entity.

### EXTENSION OF TERM

*NOTE: "Extension of Time in Patent Cases (Supplement Amendments) -- If a timely and complete response has been filed after a*

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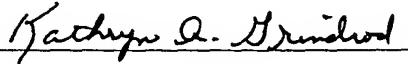
### CERTIFICATE OF MAILING/TRANSMISSION (37 C.F.R. SECTION 1.8(a))

I hereby certify that, on the date shown below, this correspondence is being:

#### MAILING

deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

#### FACSIMILE

transmitted by facsimile to the Patent and Trademark Office (703) \_\_\_\_\_.  
  
  
Signature

Date: May 15, 2003

Kathryn A. Grindrod  
(type or print name of person certifying)

# COPY

*after expiration of the shortened statutory period.*

*If a timely response has been filed after a Final Office Action, an extension of time is required to permit filing and/or entry of a Notice of Appeal or filing and/or entry of an additional amendment after expiration of the shortened statutory period unless the timely-filed response placed the application in condition for allowance. Of course, if a Notice of Appeal has been filed within the shortened statutory period, the period has ceased to run." Notice of December 10, 1985 (1061 O.G. 34-35).*

*NOTE: See 37 C.F.R. Section 1.645 for extensions of time in interference proceedings, and 37 C.F.R. Section 1.550(c) for extensions of time in reexamination proceedings.*

3. The proceedings herein are for a patent application and the provisions of 37 C.F.R. Section 1.136 apply.

*(complete (a) or (b), as applicable)*

(a)  [ ] Applicant petitions for an extension of time under 37 C.F.R. Section 1.136 (fees: 37 C.F.R. Section 1.17(a)(1)-(4)) for the total number of months checked below:

	Extension (months)	Fee for other than small entity	Fee for small entity
<input type="checkbox"/> [ ]	one month	\$ 110.00	\$ 55.00
<input type="checkbox"/> [ ]	two months	\$ 400.00	\$ 200.00
<input type="checkbox"/> [ ]	three months	\$ 920.00	\$ 460.00
<input type="checkbox"/> [ ]	four months	\$ 1,440.00	\$ 720.00

Fee: \$ \_\_\_\_\_

If an additional extension of time is required, please consider this a petition therefor.

*(check and complete the next item, if applicable)*

[ ] An extension for \_\_\_\_\_ months has already been secured. The fee paid therefor of \$ \_\_\_\_\_ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ \_\_\_\_\_

OR

(b)  [ X ] Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

# COPY

## FEE FOR CLAIMS

4. The fee for claims (37 C.F.R. Section 1.16(b)-(d)) has been calculated as shown below

(Col.1)	(Col. 2)	SMALL ENTITY			<b>OR</b>	OTHER THAN A SMALL ENTITY	
		Claims Remaining After Amendment	Highest No. Previously Paid For	Present Extra		Rate	Addit. Fee
					<b>\$9.00</b>	\$	\$
	Independent Claims				<b>\$42.00</b>	\$	\$
	First Presentation of Multiple Dependent Claim+				<b>\$140.00</b>	\$	\$
						<b>Total Addit. Fee</b>	\$

\* If the entry in Col. 1 is less than the entry in Col. 2, write "O" in Col. 3,

\*\* If the "Highest No. Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest No. Previously Paid For" (Total or Indep.) is the highest number found in the appropriate box in Col. 1 of a prior amendment or the number of claims originally filed.

**WARNING:** *"After final rejection or action (Section 1.113) amendments may be made canceling claims or complying with any requirement of form which has been made." 37 C.F.R. Section 1.116(a) (emphasis added).*

*(complete (c) or (d), as applicable)*

(c)  No additional fee for claims is required.

**OR**

(d)  Total additional fee for claims required \$ \_\_\_\_\_.

## FEE PAYMENT

5.  Attached is a check in the sum of \$ \_\_\_\_\_.  
 Charge Account No. \_\_\_\_\_ the sum of \$ \_\_\_\_\_.  
A duplicate of this transmittal is attached.

# COPY

## FEE DEFICIENCY

*NOTE: If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum, six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to charge the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, (1065 O.G. 31-33).*

6.  If any additional extension and/or fee is required, charge Account No. 04-1105.

### AND/OR

If any additional fee for claims is required, charge Account No. 04-1105.

David A. Tucker  
SIGNATURE OF PRACTITIONER

Reg. No. 27,840

David A. Tucker  
(type or print name of practitioner)  
Attorney for Applicant

Tel. No. (617) 517-5508

Edwards & Angell, LLP  
P.O. Box 9169  
P.O. Address

Customer No. 21874

Boston, MA 02209

335574

**IN THE CLAIMS:**

**Please amend Claims so as to read as follows:**

1. (As originally filed) A liquid crystal display device, comprising:
  - a liquid crystal panel including a liquid crystal layer and an electrode for applying a voltage to the liquid crystal layer; and
  - a driving circuit for supplying a driving voltage to the liquid crystal panel, wherein  
the liquid crystal panel exhibits, in its voltage-transmittance characteristics, an extreme transmittance at a voltage equal to or lower than a lowest gray-level voltage, and  
the driving circuit supplies to the liquid crystal panel a predetermined driving voltage overshooting a gray-level voltage corresponding to an input image signal of a current vertical period, according to a combination of an input image signal of an immediately preceding vertical period and the input image signal of the current vertical period.
2. (As originally filed) The liquid crystal display device according to claim 1, wherein a difference in retardation of the liquid crystal panel between a state where a voltage is not applied and a state where a highest gray-level voltage is applied is 300 nm or more.

**COPY**

3. (As originally filed) The liquid crystal display device according to claim 1, wherein the liquid crystal panel is a transmission-type liquid crystal panel, and the extreme transmittance provides a maximum transmittance.
4. (As originally filed) The liquid crystal display device according to claim 1, wherein a single vertical period of the input image signal corresponds to a single frame, at least two fields of the driving voltage correspond to a single frame of the input image signal, and the driving circuit supplies, at least in a first field of the driving voltage, a driving voltage overshooting a gray-level voltage corresponding to an input image signal of a current field to the liquid crystal panel.
5. (As originally filed) The liquid crystal display device according to claim 1, wherein the liquid crystal layer is a homogeneous-orientation liquid crystal layer.
6. (As originally filed) The liquid crystal display device according to claim 1, wherein the liquid crystal panel further includes a phase compensator, three principal refractive indices  $n_a$ ,  $n_b$  and  $n_c$  of an index ellipsoid of the phase compensator have a relation of  $n_a = n_b > n_c$ , and the phase compensator is arranged so as to cancel at least a part of retardation of the liquid crystal layer.

COPY

7. (As originally filed) A liquid crystal display device, comprising:
  - a liquid crystal panel including a plurality of picture-element capacitors arranged in a matrix, and thin film transistors respectively electrically connected to the plurality of picture-element capacitors; and
  - a driving circuit for supplying a driving voltage to the liquid crystal panel, wherein the liquid crystal display device updates display every vertical period by rendering the plurality of picture-element capacitors in a charged state corresponding to the input image signal, each of the plurality of picture-element capacitors includes a liquid crystal capacitor formed from a corresponding picture-element electrode, a counter electrode and a liquid crystal layer provided between the picture-element electrode and the counter electrode, and
  - a storage capacitor electrically connected in parallel with the liquid crystal capacitor, a capacitance ratio of the storage capacitor to the liquid crystal capacitor being 1 or more, and
- the picture-element capacitor retains 90% or more of a charging voltage over a single vertical period, when at least a highest gray-level voltage is applied.

8. (As originally filed) The liquid crystal display device according to claim 7, wherein the driving circuit supplies to the liquid crystal panel a predetermined driving voltage overshooting a gray-level voltage corresponding to an input image signal of a current vertical period, according to a combination of an input image signal of an immediately preceding vertical period and the input image signal of the current vertical period.

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9. (As originally filed) The liquid crystal display device according to claim 8, wherein, for the input image signal of every gray level, the driving circuit supplies to the liquid crystal panel the driving voltage overshooting the gray-level voltage corresponding to the input image signal of the current vertical period.
10. (As originally filed) The liquid crystal display device according to claim 7, wherein the liquid crystal layer of the liquid crystal panel includes a nematic liquid crystal material having a positive dielectric anisotropy, the liquid crystal layer included in each of the plurality of picture-element capacitors includes first and second regions having different orientation directions, and the liquid crystal panel further includes a pair of polarizers arranged so as to orthogonally cross each other with the liquid crystal layer interposed therebetween, and a phase compensator for compensating for a refractive index anisotropy of the liquid crystal layer in a black display state.
11. (As originally filed) The liquid crystal display device according to claim 7, wherein the liquid crystal layer is a homogeneous-orientation liquid crystal layer.
12. (As originally filed) The liquid crystal display device according to claim 11, wherein the liquid crystal panel further includes a phase compensator, three principal refractive indices  $n_a$ ,  $n_b$  and  $n_c$  of an index ellipsoid of the phase compensator have a relation of  $n_a = n_b > n_c$ , and the phase compensator is arranged so as to cancel at least a part of retardation of the liquid crystal layer.

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13. (New Claim) A liquid crystal display device, in which a driving circuit applies a driving voltage to a liquid crystal panel to control the transmittance of the liquid crystal panel for display, wherein:

the liquid crystal panel exhibits, in its voltage-transmittance characteristics, a maximum or minimum transmittance at a voltage lower than a lowest gray-level voltage; and  
the driving circuit selectively supplies to the liquid crystal panel as a predetermined driving voltage corresponding to an input image signal of a current vertical period, according to a combination of an input image signal of an immediately preceding vertical period and an input image signal of the current vertical period, at least a gray-level voltage which falls within a range between the lowest gray-level voltage and the highest gray-level voltage, and an overshoot gray-level voltage which is lower than the lowest gray-level voltage.

14. (New Claim) A liquid crystal display device according to claim 13, wherein:

the liquid crystal panel is a normally white mode liquid crystal panel.

15. (New Claim) A liquid crystal display device according to claim 14, wherein

the driving circuit selectively applies the gray-level voltage which falls within a range between the lowest gray-level voltage and the highest gray-level voltage, the overshoot voltage which is lower than the lowest gray-level voltage, and an overshoot gray-level voltage which is higher than the highest gray-level voltage.

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16. (New Claim) A liquid crystal display device according to claim 13, wherein:  
the liquid crystal panel is a normally black mode liquid  
crystal panel.
  
17. (New Claim) A liquid crystal display device according to claim 16, wherein  
the driving circuit selectively applies the gray-level voltage which  
falls within a range between the lowest gray-level voltage and the  
highest gray-level voltage, the overshoot voltage which is lower  
than the lowest gray-level voltage, and an overshoot gray-level  
voltage which is higher than the highest gray-level voltage.

**COPY**

**REMARKS**

This Preliminary Amendment is being filed for the purpose of adding Claims 13 – 17 prior to the initial substantive examination of this application.

All of the claims that will be pending in this application upon the entry of the foregoing Amendment are set forth above as required by the Rules.

Applicants respectfully submit that New Claims 13 - 17 do not add any new matter to this application. Further, the entry of New Claims 13 – 17 will provide what Applicants respectfully submit is a more clear, complete and appropriate range of coverage of the subject matter that Applicants regard as their invention.

Applicants respectfully submit that Claims 1 - 17 of this application, as they will stand upon the entry of the foregoing Amendment, are in condition for allowance. Entry of the foregoing Amendment, early consideration of this application and allowance of this application in response to this communication, therefore, are respectfully requested.

**COPY**

Applicants also believe that additional fees beyond those submitted herewith are not required in connection with the consideration of this response to the currently outstanding Official Action. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge and/or credit Deposit Account No. **04-1105**, as necessary, for the correct payment of all fees which may be due in connection with the filing and consideration of this communication.

Respectfully submitted,

Date: May 15, 2003

By: David A. Tucker

David A. Tucker  
Reg. No. 27,840  
Attorney for Applicant(s)

EDWARDS & ANGELL, LLP  
P.O. Box 9169  
Boston, Massachusetts 02209  
(617-517-5508)



# COPY

Attorney's Docket No. 55750 (45672)  
PATENT

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Takako Adachi, et al.  
Application No.: 09/820,021 Group: 2674  
Filed: March 28, 2001 Examiner: Zamani, Ali A.  
For: LIQUID CRYSTAL DISPLAY DEVICE

Mail Stop: office of Petitions  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

## CERTIFICATE OF EXPRESS MAILING UNDER 37 C.F.R. 1.10

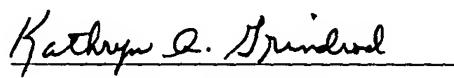
I hereby certify that the following correspondence:

Petition For Revival Of An Application For Patent Abandoned Unintentionally Under 37 CFR 1.137(b)  
including its attachments

Is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service  
under 37 CFR 1.10 (Express Mail Label No. EV 343733545 US), and is addressed to:

Mail Stop: Office of Petitions  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

on July 18, 2003

  
\_\_\_\_\_  
Kathryn A. Grindrod

342021



21874

PATENT TRADEMARK OFFICE

**COPY**

**Attorney Docket No. 55,750 (45672)**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICANT(S): T. Adachi, et al EXAMINER: Zamani, Ali A.

SERIAL NO.: 09/820,021 GROUP: 2674

FILED: 28 March 2001

FOR: LIQUID CRYSTAL DISPLAY DEVICE

\*\*\*\*\*

**CERTIFICATE OF EXPRESS MAILING**

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service as Express Mail, Post Office to Address Service, Express Mail Label No. **EV343733545US** under 37 CFR 1.10 in an envelope addressed to Mail Stop: Office of Petitions, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on 18 July 2003.

By: Kathryn A. Grindrod  
Kathryn A. Grindrod

\*\*\*\*\*

Mail Stop: Office of Petitions  
COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**SUPPLEMENTAL STATEMENT IN SUPPORT OF PETITION FOR  
REVIVAL OF ABANDONED APPLICATION UNDER 37 CFR 1.137(b)**

In further support of the Petition to Revive the above-identified application under 37 CFR 1.137(b) the undersigned attorney for Applicants states as follows:

**COPY**

The Notice of Abandonment in the above-identified application was issued by the United States Patent Office on 18 June 2003 on the basis that Applicants failed to respond to an Official Action dated 20 November 2002 prior to the statutory due date for the filing of such a response (i.e., 20 May 2003).

Applicants and Applicants' attorney's failure to file a timely response to the Official Action dated 20 November 2002 was unintentional throughout the entire statutory period for response.

More particularly, Applicants' attorneys, who were designated to receive correspondence from the United States Patent and Trademark Office in connection with the above-identified application, have to date not received a copy of the Official Action dated 20 November 2002 in the above-identified case. Further, Applicants' attorneys did not become aware of the existence of the Official Action of 20 November 2002 in the above-identified case until on or about 10 June 2003 in connection with the citation of the publication of this application against another application being prosecuted by this office.

At the time the Official Action of 20 November 2002 was issued, Applicants' attorney's address had changed from 130 Water Street, Boston, MA as designated in the originally filed application papers to P.O. Box 9169, 101 Federal Street, Boston, MA, and no formal change of address had yet been filed in this application. Nevertheless, as of 20 November 2002, Applicants' attorneys had in place an agreement with the United States Postal Service under which all mail addressed to their prior address was to be delivered to them at their new address. Applicants' attorneys consistently received mail directed to them by the United States Patent and Trademark Office at their former address at their new address until at least the end of December 2002, but the Official Action dated 20 November 2002 in this case was never so received.

**COPY**

On 5 December 2002, Applicants' attorneys submitted to the United States Patent and Trademark Office a spreadsheet including some 24 pages detailing the patent applications and issued patents that they desired to be associated with their customer number, 21874 (see copy attached). The above-identified application is listed on page 23 of that spreadsheet as the 10<sup>th</sup> item from the top. This submission is believed to have been sufficient as a formal change of address in all of the listed cases.

Accordingly, it is respectfully submitted that Applicants' attorneys acted reasonably and properly to assure that all mail directed to them by the United States Patent and Trademark Office would either be forwarded to the by the United States Postal Service or correctly addressed by virtue of the notification document attached hereto.

Still further, attention is respectfully directed to the fact that Applicants filed a Preliminary Amendment in the above-identified case on 15 May 2003 and filed a Status Inquiry in the above-identified case on 28 May 2003. It is respectfully submitted that these filings were inconsistent with any receipt of the Official Action of 20 November 2002 in the above-identified case, and support Applicants' attorneys' statements to the effect that the Official Action of 20 November 2002 was never received. (See copies attached as part of the continuation application filed concurrently herewith)

Finally, Applicants' attorneys wish to acknowledge a series of telephone interviews conducted with the Examiner in early June of 2003 concerning the status of this application. During these interviews, Applicants' attorneys attempted to secure the re-issuance of the Official Action of 20 November 2002 by the Examiner based upon the fact that it had never been received. The result of these interviews, however, was that the Examiner after consultation with his supervisor refused Applicants' attorneys' request and indicated that a Notice of Abandonment would be issued in due course from which Applicants could petition for revival.

It is respectfully submitted that the foregoing circumstances clearly establish the fact that the failure to respond to the Official Action of 20 November 2002 in this application was unintentional for the entire statutory period for response and that Applicants by the filing of the attached Petition and Continuation Application have acted diligently to correct to unintended basis for the presently outstanding holding of abandonment.

Revival of this application at least for the purpose of allowing the filing of the attached continuation application during the pendency of the above-identified application is therefore respectfully requested.

COPY

Applicants also believe that additional fees beyond those submitted herewith are not required in connection with the consideration of this submission. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge and/or credit Deposit Account No. **04-1105**, as necessary, for the correct payment of all fees which may be due in connection with the filing and consideration of this communication.

Respectfully submitted,

Date: July 18, 2003

By: David A. Tucker

David A. Tucker  
Reg. No. 27,840  
Attorney for Applicant(s)

EDWARDS & ANGELL, LLP  
P.O. Box 9169  
Boston, Massachusetts 02209  
(617-517-5508)  
341954



21874

PATENT TRADEMARK OFFICE

# COPY

00021874

Edwards & Angel, LLP  
P.O. Box 9169  
Boston, MA 02209-4180

Address		Name	
4924378	07205986	0506950	06/13/88 & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US
4965806	07205620	10/30/90	06/14/88 & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US
5395088	07884263	03/07/95	04/11/89 & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US
4470109	06307251	09/04/84	09/30/81 & PFUND, 130 WATER ST., BOSTON, MA 02109, US
4582608	06702057	04/11/86	02/11/85 & PFUND, 130 WATER ST., BOSTON, MA 02109, US
4589109	06299932	05/13/86	04/11/84 & PFUND, 130 WATER ST., BOSTON, MA 02109, US
4656131	06874398	04/07/87	11/28/84 & PFUND, 130 WATER ST., BOSTON, MA 02109, US
4816308	06792817	03/28/89	10/30/85 & PFUND, 130 WATER ST., BOSTON, MA 02109, US
4516220	06604459	05/14/85	04/22/84 & PFUND, 130 WATER STREET, BOSTON, MA 02109, US
4692451	06807814	09/09/87	12/11/85 & PFUND, 130 WATER STREET, BOSTON, MA 02109, US
4895729	07244786	01/23/90	10/9/15/88 & PFUND, 130 WATER STREET, BOSTON, MA 02109, US
4937741	07187452	06/25/90	07/18/82 & PFUND, 130 WATER STREET, BOSTON, MA 02109, US
5581435	07058344	07/19/87	06/05/87 & PFUND, 130 WATER STREET, BOSTON, MA 02109, US
5581435	07792218	12/03/96	11/08/91 08/09/01 130 Water Street, Boston, MA 02109, US
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6006505	09126474	12/26/99	03/19/02 130 WALTER STREET, BOSTON, MA 02109, US
6006505	09413367	10/06/99	130 WALTER STREET, BOSTON, MA 02109, US
5775839	08578516	07/07/96	03/11/96 130 WATER ST, BOSTON, MA 02109, US
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6226635	0935116	05/06/01	10/31/99 130 WATER ST, BOSTON, MA 02109, US
6280791	08793728	09/04/01	02/28/97 130 WATER ST, BOSTON, MA 02109, US
4822335	07094111	04/18/99	09/08/97 130 WATER ST, BOSTON, MA 02109, US
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5077160	07472030	12/10/93	01/30/90 130 WATER ST, BOSTON, MA 02109, US
5093662	07472534	03/03/92	01/30/90 130 WATER ST, BOSTON, MA 02109, US
5106528	07559308	04/21/92	07/30/90 130 WATER ST, BOSTON, MA 02109, US
5115302	07667322	05/19/92	04/18/97 11/07/91 130 WATER ST, BOSTON, MA 02109, US
5115794	07433571	07/21/92	12/19/90 130 WATER ST, BOSTON, MA 02109, US
5132820	07630039	07/21/92	11/09/98 130 WATER ST, BOSTON, MA 02109, US
5135920	07434440	08/04/92	



**COPY**

5182195	07269140	012693	1109988	130 WATER ST., BOSTON, MA 02109, US
5205734	07576455	051193	0917950	130 WATER ST., BOSTON, MA 02109, US
5327521	07852121	0710594	0116932	130 WATER ST., BOSTON, MA 02109, US
4740086	06855373	110387	1213185	130 WATER STREET, BOSTON, MA 02109, US
5215678	07219245	0670193	1217091	130 WATER STREET, BOSTON, MA 02109, US
	09885510		0620001	130 Water Street, Boston, MA 02109, US
	10041068		110101	130 Water Street, Boston, MA 02103, US
	0431753	09990667	1017000	0711499
	0822348	07049613	0418189	0418189
	4839248	07766301	0611793	0611793
	4844052	071031439	0711169	032687
	4876331	07250461	1102499	0811098
	4903126	07134774	0226590	1211687
	4917626	0711795	0117950	032298
	4917774	06855360	0411790	0402486
	4922710	0715795	051590	0331988
	4933740	07141689	0612690	1213087
	4942883	07125450	0712490	092987
	4947187	07288640	0807790	0111899
	4952286	07133366	0828960	0208888
	4960668	07449283	0820290	1205989
	4968162	073633459	110690	060689
	4973442	070988710	1127790	0912167
	4983640	07203043	0108091	060688
	4991155	07495891	0205991	0311950
	4994235	07431562	0211919	1103689
	5002017	07355780	0326961	0522898
	5004525	07438800	0402091	1112088
	5007990	07153357	0416971	0208888
	5008286	07401612	0416169	0828698
	5008739	06748422	0116971	0112950
	5011834	07337858	0413091	0411489
	5012953	07420606	0507971	1112189
	5011705	07570147	0512191	0802090
	5011757	07383247	0512191	0111989
	5017742	0743548	0512191	1111988
	5022521	07484141	0611891	0111690
	5026809	07381019	0625961	0610268
	5028284	07181210	0702191	0411388
	5042626	07421453	0710368	130 WATER STREET, BOSTON, MA 02109, US
	5039689	07433464	0811391	1106989
	5040765	07525123	0820291	0511790
	5042605	0821791	0905169	130 WATER STREET, BOSTON, MA 02109, US
	5044982	07328073	0822189	130 WATER STREET, BOSTON, MA 02109, US
	5044536	07434545	0903191	1106989
	5046847	07571032	0911091	0812290
	5046847	0712258	0911791	0811987
	5046871	07455538	0911791	1222189
	5048848	07442154	0911791	1112989
	5011514	074411381	0924917	0121169
	5053418	07449485	1010197	130 WATER STREET, BOSTON, MA 02109, US
	5055164	071486418	10108191	032690
	5058292	07521439	0511591	0511090
	5059141	0753404	0611591	0606190
	5058781	0760428	1012291	130 WATER STREET, BOSTON, MA 02109, US
	5069830	07557623	110591	0724960
	110591		130 WATER STREET, BOSTON, MA 02109, US	

**COPY**

5665117	07533576	11/2/291	06/05/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
50634013	07471639	11/26/91	01/29/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., DIKE, BRONSTEIN,
50634143	07272823	11/26/91	01/29/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERT &
5070116	07652488	12/03/91	02/07/91	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W. NEUNER, ESQ., DIKE, BRONSTEIN,
5070360	07631669	12/03/91	12/21/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5077575	07626637	12/31/91	12/27/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5079682	07442999	01/07/92	11/28/89	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5079131	07653392	01/07/92	02/11/91	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., DIKE, BRONSTEIN,
5079235	07455552	01/07/92	01/16/90	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, ESQ., DIKE, BRONSTEIN,
5082597	07411668	01/12/92	05/25/89	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5082690	07533766	01/21/92	05/11/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5084302	07503312	01/28/92	03/24/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5084725	07602718	01/28/92	10/24/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT G. CONLIN, ESQ., DIKE, BRONSTEIN,
5087247	07547430	02/11/92	08/28/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5089500	07697260	02/18/92	05/08/91	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, DIKE, BRONSTEIN, ROBERTS &
5091366	07455138	02/25/92	12/12/89	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5091444	07478664	02/25/92	03/11/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN, ROBERTS &
5092857	07456392	03/03/92	03/11/90	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DONALD BROWN, ESQUIRE, DIKE,
5098757	07458126	03/10/92	03/11/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, DIKE, BRONSTEIN,
5099425	07544759	03/10/92	06/27/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5099518	07674435	03/10/92	03/22/91	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, DIKE, BRONSTEIN, ROBERTS &
5095039	07553313	03/16/92	05/05/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5096895	07167274	03/17/92	03/22/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5097287	07595284	03/17/92	09/17/90	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DAVID G. CONLIN, DIKE, BRONSTEIN,
5099673	07615296	03/24/92	03/28/91	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5100832	07492921	03/31/92	03/31/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5104505	07515506	04/11/92	06/30/90	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, DIKE, BRONSTEIN, ROBERTS &
5104870	07680637	04/11/92	04/02/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5104897	07727364	04/11/92	06/28/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5105355	075534181	04/11/92	06/08/91	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DONALD BROWN, ESQ., DIKE, BRONSTEIN,
5105603	07621588	04/21/92	12/03/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5106454	07607548	04/21/92	04/21/91	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5107866	07407445	04/21/92	05/08/91	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, DIKE, BRONSTEIN, ROBERTS &
5108064	07609888	04/28/92	11/05/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5112609	07527264	05/11/92	05/21/90	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DONALD BROWN, DIKE, BRONSTEIN,
5112835	07444930	05/11/92	11/28/89	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5120665	07653068	05/09/92	02/08/91	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5120786	07632411	05/09/92	12/21/90	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, DIKE, BRONSTEIN, ROBERTS &
5121234	07672402	05/12/92	03/20/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5121609	07527264	05/11/92	05/21/90	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DONALD BROWN, ESQ., DIKE, BRONSTEIN,
5121620	07527264	05/11/92	11/28/89	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5120970	07364707	04/28/92	06/08/89	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5120976	07553241	05/05/92	11/05/90	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, DIKE, BRONSTEIN, ROBERTS &
5121114	07529873	06/06/92	05/29/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5121620	07644732	07/07/92	01/23/91	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DONALD BROWN, ESQ., DIKE, BRONSTEIN,
5130630	07661121	07/14/92	02/27/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5134414	07672464	07/28/92	03/20/91	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5135783	07458571	08/04/92	12/29/89	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5138803	07498989	08/04/92	03/27/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5153338	07563793	08/11/92	11/14/89	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5142026	07334674	08/25/92	05/03/89	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5145746	07781306	08/08/92	10/25/91	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, DIKE, BRONSTEIN,
5148497	07372262	08/22/92	06/28/89	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5151214	07559399	08/29/92	10/04/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5153338	07563793	10/06/92	08/03/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5158576	0763310	10/27/92	12/19/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5158860	07607711	10/27/92	11/01/90	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, DIKE, BRONSTEIN,
5160660	07698888	11/03/92	05/14/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN,

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5161105	015454339	110392	0627790	130 WATER STREET, BOSTON, MA 02109, US
5161873	07841367	111092	022592	130 WATER STREET, BOSTON, MA 02109, US
5162786	07619299	111092	112290	130 WATER STREET, BOSTON, MA 02109, US
5162786	07619299	111092	120390	130 WATER STREET, BOSTON, MA 02109, US
5164110	07172517	111792	120390	130 WATER STREET, BOSTON, MA 02109, US
5164110	07172517	111792	067391	130 WATER STREET, BOSTON, MA 02109, US
5164485	07549748	111792	070390	130 WATER STREET, BOSTON, MA 02109, US
5164485	07549748	111792	027291	130 WATER STREET, BOSTON, MA 02109, US
5166511	07641146	112492	0171591	130 WATER STREET, BOSTON, MA 02109, US
5166511	07641146	112492	0671291	130 WATER STREET, BOSTON, MA 02109, US
5170270	07574445	120892	0627890	130 WATER STREET, BOSTON, MA 02109, US
5171366	07421536	122192	101689	130 WATER STREET, BOSTON, MA 02109, US
5171366	07421536	122192	0620392	130 WATER STREET, BOSTON, MA 02109, US
5175813	07938561	122992	0626291	130 WATER STREET, BOSTON, MA 02109, US
5175813	07938561	122992	1003869	130 WATER STREET, BOSTON, MA 02109, US
5175819	07758629	122992	0671291	130 WATER STREET, BOSTON, MA 02109, US
5175819	07758629	122992	0671291	130 WATER STREET, BOSTON, MA 02109, US
5175933	07473593	122992	06731718	130 WATER STREET, BOSTON, MA 02109, US
5175933	07473593	122992	0670593	130 WATER STREET, BOSTON, MA 02109, US
5177539	07776998	0110593	101691	130 WATER STREET, BOSTON, MA 02109, US
5177539	07776998	0110593	101691	130 WATER STREET, BOSTON, MA 02109, US
5179856	07416553	0112923	067192	130 WATER STREET, BOSTON, MA 02109, US
5179856	07416553	0112923	067192	130 WATER STREET, BOSTON, MA 02109, US
5181706	07672652	012693	0320291	130 WATER STREET, BOSTON, MA 02109, US
5181706	07672652	012693	0670191	130 WATER STREET, BOSTON, MA 02109, US
5184986	07535353	020293	0605090	130 WATER STREET, BOSTON, MA 02109, US
5184986	07535353	020293	0605090	130 WATER STREET, BOSTON, MA 02109, US
5184812	07616937	0301993	050891	130 WATER STREET, BOSTON, MA 02109, US
5184812	07616937	0301993	102969	130 WATER STREET, BOSTON, MA 02109, US
5192644	07604581	0301993	0529690	130 WATER STREET, BOSTON, MA 02109, US
5193082	07502104	0301993	0529690	130 WATER STREET, BOSTON, MA 02109, US
5194488	07758976	031693	0670191	130 WATER STREET, BOSTON, MA 02109, US
5194488	07758976	031693	0670191	130 WATER STREET, BOSTON, MA 02109, US
5194890	07520591	031693	0571590	130 WATER STREET, BOSTON, MA 02109, US
5194890	07520591	031693	0571590	130 WATER STREET, BOSTON, MA 02109, US
5195442	07502105	0320193	0572891	130 WATER STREET, BOSTON, MA 02109, US
5195442	07502105	0320193	0672891	130 WATER STREET, BOSTON, MA 02109, US
5200763	07750575	0406693	0627291	130 WATER STREET, BOSTON, MA 02109, US
5200763	07750575	0406693	0627291	130 WATER STREET, BOSTON, MA 02109, US
5201852	07885725	041393	0571992	130 WATER STREET, BOSTON, MA 02109, US
5202242	07663321	042193	062191	130 WATER STREET, BOSTON, MA 02109, US
5204343	07484900	0420193	0306890	130 WATER STREET, BOSTON, MA 02109, US
5204380	07751590	0420293	0622997	130 WATER STREET, BOSTON, MA 02109, US
5204724	07745492	0420293	0681491	130 WATER STREET, BOSTON, MA 02109, US
5206335	07761534	0420293	0682791	130 WATER STREET, BOSTON, MA 02109, US
5206335	07761534	0420293	0682791	130 WATER STREET, BOSTON, MA 02109, US
5207852	07771454	0427793	0683091	130 WATER STREET, BOSTON, MA 02109, US
5207889	07719928	0504193	0622491	130 WATER STREET, BOSTON, MA 02109, US
5207992	07683093	0504193	0622491	130 WATER STREET, BOSTON, MA 02109, US
5210000	07683093	0511193	0620692	130 WATER STREET, BOSTON, MA 02109, US
5210029	07539612	0511193	0681890	130 WATER STREET, BOSTON, MA 02109, US
5216111	07600882	0506193	1022790	130 WATER STREET, BOSTON, MA 02109, US
5216114	07759933	0506193	0691691	130 WATER STREET, BOSTON, MA 02109, US
5216114	07759933	0506193	111590	130 WATER STREET, BOSTON, MA 02109, US
5216614	07613611	0506193	111590	130 WATER STREET, BOSTON, MA 02109, US
5219855	07639737	0681593	0221992	130 WATER STREET, BOSTON, MA 02109, US
5223118	07668672	0622993	0306891	130 WATER STREET, BOSTON, MA 02109, US
5223952	07788482	0622993	1107190	130 WATER STREET, BOSTON, MA 02109, US
5225184	07619880	070693	1122990	130 WATER STREET, BOSTON, MA 02109, US
5225884	07650783	070693	0640391	130 WATER STREET, BOSTON, MA 02109, US
5225893	07113352	070593	0170892	130 WATER STREET, BOSTON, MA 02109, US
5225893	07787029	070593	0170892	130 WATER STREET, BOSTON, MA 02109, US
5235130	07948138	0810193	0981892	130 WATER STREET, BOSTON, MA 02109, US
5237439	07957474	0817193	0830392	130 WATER STREET, BOSTON, MA 02109, US
5238850	07798754	0824193	1122791	130 WATER STREET, BOSTON, MA 02109, US
5239100	07740101	0824193	1222492	130 WATER STREET, BOSTON, MA 02109, US
5239861	07688628	0824193	0681391	130 WATER STREET, BOSTON, MA 02109, US
5239805	07938518	0830193	0826292	130 WATER STREET, BOSTON, MA 02109, US
5243427	07655339	0821193	0621993	130 WATER STREET, BOSTON, MA 02109, US
5243438	0778876	0914973	0826291	130 WATER STREET, BOSTON, MA 02109, US
5247332	07788601	0921193	1101691	130 WATER STREET, BOSTON, MA 02109, US

**COPY**

5246599	07/482266	09/28693	02/20/90	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DAVID G. CONLIN, DIKE, BRONSTEIN,
5250296	07/083686	10/05/93	11/27/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5250393	07/083686	10/05/93	11/27/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5254165	07/098045	10/19/93	11/18/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, DIKE, BRONSTEIN,
5256418	07/050568	10/26/93	04/06/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5260120	07/053306	10/19/93	03/25/91	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5262041	07/098377	11/16/93	12/11/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, DIKE, BRONSTEIN,
5262280	07/086343	11/16/93	04/07/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, DIKE, BRONSTEIN,
5262303	07/055451	11/16/93	10/11/90	130 WATER STREET, BOSTON, MA 02109, US	LINDA M. BUCKLEY, ESQ., DIKE, BRONSTEIN,
5262668	07/063134	11/16/93	03/04/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5262856	07/083442	11/16/93	03/07/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, ESQ., DIKE, BRONSTEIN,
5263333	07/544836	11/16/93	06/27/90	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W. NEUNER, ESQ., DIKE, BRONSTEIN,
5268241	07/083928	11/20/93	02/20/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5271867	07/082751	12/11/92	01/27/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5276680	07/0880832	01/04/94	05/11/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5283477	07/065257	02/01/94	03/13/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT M. ASHER, DIKE, BRONSTEIN, ROBERTS &
5285240	07/085487	02/08/94	05/11/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, DIKE, BRONSTEIN,
5286897	07/085487	02/08/94	11/26/91	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DAVID G. CONLIN, DIKE, BRONSTEIN,
5287145	07/0805623	02/15/94	04/07/93	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5290807	07/0917827	03/01/94	07/21/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS
5291323	07/075922	03/01/94	09/30/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN, ET AL
5296539	07/0944008	03/12/94	09/11/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, DIKE, BRONSTEIN,
5300839	07/0826629	03/03/94	01/17/92	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DAVID G. CONLIN, DIKE, BRONSTEIN,
5303905	07/0964934	03/07/94	10/22/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5312096	07/0525058	05/17/94	03/02/93	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5312334	08/001112	05/17/94	01/05/93	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5312928	07/0654104	05/17/94	02/11/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5312944	07/0986987	05/17/94	12/24/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5314055	07/0955614	05/17/94	08/25/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5314789	07/770016	05/24/94	01/01/91	130 WATER STREET, BOSTON, MA 02109, US	ROBERT G. CONLIN, ESQ., DIKE, BRONSTEIN,
5322680	07/0904433	07/05/94	08/04/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5322886	07/082845	07/12/94	02/11/92	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
53318974	07/0974471	08/06/94	03/05/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS
5331928	07/0654104	05/17/94	02/11/91	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W. NEUNER, ESQ., DIKE, BRONSTEIN,
5332110	07/0986987	05/17/94	12/24/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5332052	07/0955614	05/17/94	08/25/92	130 WATER STREET, BOSTON, MA 02109, US	PETER J. MANUS, ESQ., DIKE, BRONSTEIN, ROBERTS &
5334229	07/0904433	07/05/94	08/04/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, DIKE, BRONSTEIN,
5332843	07/0974471	08/06/94	03/05/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5333356	07/0934570	08/02/94	08/02/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS
5333930	07/0986851	08/01/94	12/07/92	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, DIKE, BRONSTEIN,
5333689	08/1054548	08/01/94	01/11/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5334229	07/0904433	07/05/94	08/04/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5334497	08/0055938	09/06/94	01/11/93	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS
5345769	07/0975219	08/01/94	11/11/92	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W. NEUNER, ESQ., DIKE, BRONSTEIN,
5347343	08/008876	09/11/94	07/06/93	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, DIKE, BRONSTEIN,
5350637	07/0927606	09/27/94	08/01/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5353057	08/0183600	10/04/94	12/07/93	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS &
5353221	07/0619223	10/04/94	01/11/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ROBERTS
5354497	08/0059269	10/11/94	04/19/93	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W. NEUNER, ESQ., DIKE, BRONSTEIN,
53557128	08/0157755	10/18/94	11/24/93	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, DIKE, BRONSTEIN,
5358819	08/0047649	10/25/94	04/17/93	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, DIKE, BRONSTEIN, ET AL.
5359467	08/0174744	10/25/94	02/11/93	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DAVID G. CONLIN, DIKE, BRONSTEIN,
5363221	08/0081498	11/15/94	06/22/93	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5363957	08/0119709	11/15/94	09/01/93	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5364026	07/0752236	11/15/94	11/14/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,
5365172	07/0927173	11/15/94	08/07/92	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W. NEUNER, ESQ., DIKE, BRONSTEIN,
5367314	07/0786724	11/22/94	09/22/91	130 WATER STREET, BOSTON, MA 02109, US	DAVID G. CONLIN, ESQ., DIKE, BRONSTEIN,

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5685779	08656748	01/12/99	12/05/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5852243	08929793	01/12/99	09/15/97	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS	Yes
5863441	09044753	01/26/99	03/19/98	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5868053	08782955	01/22/99	01/13/97	130 WATER STREET, BOSTON, MA 02109, US	ERNEST V LINEK, DIKE BRONSTEIN ROBERTS AND CUSHMAN	Yes
5873878	08841156	02/23/99	04/29/97	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS	Yes
5874247	08882877	02/23/99	06/26/97	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS	Yes
5874277	08845599	02/23/99	04/10/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID S RESNICK, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5887113	08911445	03/02/99	08/17/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5883075	08680534	03/16/99	07/07/96	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS	Yes
5883274	08656566	03/16/99	08/10/96	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN	Yes
5886141	08456764	03/20/99	06/10/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID S RESNICK, DIKE BRONSTEIN ROBERTS	Yes
5888760	08843634	03/20/99	04/10/97	130 WATER STREET, BOSTON, MA 02109, US	LINDA M BUCKLEY, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5891074	08697327	04/06/99	10/10/98	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS	Yes
5892126	08598952	04/06/99	11/13/97	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN	Yes
5898100	08787300	05/10/99	01/24/97	130 WATER STREET, BOSTON, MA 02109, US	HENRY D PAHL, JR., DIKE BRONSTEIN ROBERT & CUSHMAN	Yes
5904890	08694546	05/18/99	10/21/97	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS	Yes
5905669	08785395	06/01/99	01/06/97	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5911697	08993813	12/17/97	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes	
5919687	08874104	07/06/99	12/24/96	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS	Yes
5922614	086889105	07/13/99	06/04/97	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN	Yes
5922759	08448809	07/13/99	08/20/95	130 WATER STREET, BOSTON, MA 02109, US	HENRY D PAHL, JR., DIKE BRONSTEIN ROBERT & CUSHMAN	Yes
5932079	089956078	08/10/99	10/12/97	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS	Yes
5933494	09045459	08/10/99	03/20/98	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5939159	08715312	08/17/99	09/16/96	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5940145	085984784	08/17/99	12/04/97	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN	Yes
5941399	09115348	09/17/99	07/21/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5945279	08874586	09/14/99	08/20/98	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS	Yes
5950709	08787556	09/14/99	03/24/98	130 WATER STREET, BOSTON, MA 02109, US	HENRY D PAHL, JR., DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5955924	08847151	09/12/99	03/24/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5955957	08449975	09/12/99	06/20/95	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5956091	08820700	09/21/99	05/13/98	130 WATER STREET, BOSTON, MA 02109, US	MILTON OLIVER, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5956147	09230361	09/28/99	12/01/98	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5956187	08828472	09/28/99	03/19/97	130 WATER STREET, BOSTON, MA 02109, US	MILTON OLIVER, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5959455	08944283	09/28/99	10/06/97	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5961517	089565642	10/05/99	11/25/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5964742	089083325	10/12/99	05/05/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID BRONSTEIN ROBERTS & CUSHMAN	Yes
5964755	09142304	10/12/99	09/10/96	130 WATER STREET, BOSTON, MA 02109, US	MILTON OLIVER, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5971061	09138439	10/26/99	09/12/98	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5972031	089936403	10/26/99	09/25/97	130 WATER STREET, BOSTON, MA 02109, US	PETER J MANUS, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5972457	089988898	10/26/99	11/26/97	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5972627	08982822	10/26/99	12/24/97	130 WATER STREET, BOSTON, MA 02109, US	PETER J MANUS, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5982950	08952908	11/02/99	09/10/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID BRONSTEIN ROBERTS & CUSHMAN	Yes
5988087	08744882	11/09/99	11/08/96	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5991197	086027655	11/09/99	02/23/99	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5998665	08814066	11/16/99	03/19/98	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6002072	087859327	11/16/99	02/05/97	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6002950	08952908	11/23/99	11/24/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6003175	089118722	11/26/99	09/10/98	130 WATER STREET, BOSTON, MA 02109, US	ERNEST V LINEK, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5985361	08781393	11/30/99	02/22/99	130 WATER STREET, BOSTON, MA 02109, US	LINDA M BUCKLEY, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
5997498	08074960	12/07/99	05/07/98	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6001575	089956562	12/14/99	03/19/98	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6002011	08995959	01/21/99	01/21/98	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6002029	08986881	01/21/99	12/08/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6002317	085984951	01/21/99	04/13/98	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6005253	08897441	01/22/99	08/25/99	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6011596	08871925	01/20/00	06/11/97	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6013762	089049813	01/11/00	03/27/98	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes

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6013784	059802253	01/1/1000	07/29/97	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN, ROBERT & CUSHMAN	Yes
6015552	059910631	01/1/1000	07/17/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6017588	059030735	01/25/00	07/25/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6017610	06451776	01/25/00	05/26/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6022833	059000314	02/08/00	01/30/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6025555	06858399	02/15/00	05/19/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6025467	05044536	02/15/00	05/19/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6030118	05068119	02/29/00	05/13/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6034217	05928917	03/07/00	05/13/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6042774	05015156	03/28/00	01/29/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
604428	05112108	03/04/00	07/08/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6049148	051168084	04/11/00	10/02/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6051026	05076013	04/18/00	04/03/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6052870	05144742	04/25/00	05/01/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6053441	05925269	04/25/00	05/04/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6057371	05084771	05/02/00	06/01/92	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6057984	05325176	05/02/00	06/03/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6066670	05082474	05/23/00	06/09/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6068890	051157349	05/30/00	05/18/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6071956	05041700	06/06/00	05/05/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6071657	05251601	06/20/00	02/16/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6087346	050564382	07/1/00	02/21/96	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6090117	050308517	07/18/00	05/20/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6097124	050950033	08/01/00	02/23/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6103982	05015618	08/15/00	06/26/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6106526	050737158	08/22/00	07/28/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6110991	050141827	08/29/00	08/28/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6110991	05043285	08/29/00	05/12/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6120227	050348418	08/19/00	07/07/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6121057	05070938	08/19/00	05/13/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6121246	050545998	08/19/00	05/20/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6132666	016115988	10/17/00	11/20/90	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6132988	050738168	10/17/00	10/25/96	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6133520	060033327	10/17/00	03/09/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6136024	053319527	10/24/00	06/04/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6143791	050482984	11/07/00	05/28/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6147051	050561056	11/14/00	11/12/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6147053	050456741	11/14/00	05/02/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6147845	050287979	11/14/00	04/07/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6150176	05275476	11/21/00	03/24/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6151533	050893152	11/21/00	07/15/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6153604	050458093	11/28/00	06/02/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6153616	050319616	11/28/00	06/08/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6155331	050571838	12/05/00	05/17/96	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6156077	050041422	12/05/00	03/12/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6156514	050204979	12/05/00	12/03/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6156741	050459506	12/05/00	05/02/95	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6159301	050519584	12/12/00	06/22/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6162026	050284540	12/19/00	04/14/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6165156	050947235	12/26/00	10/08/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6168979	050930148	01/02/01	10/08/97	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6174134	050236133	01/16/01	01/25/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6174922	052617250	01/23/01	03/03/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6180209	050408431	01/26/01	05/22/99	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6183948	05006074	02/06/01	04/15/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6191136	05198755	02/20/01	11/05/98	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes

DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN

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6194224	09123316	05227101	0727798	130 WATER STREET, BOSTON, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6197790	05091069	0305601	0717399	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN	Yes
6204278	06852424	0320101	057197	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN	Yes
6206701	05352599	0322701	0717399	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6207431	06182983	03227101	1030968	130 WATER STREET, BOSTON, MA 02109, US	RONALD I EISENSTEIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6218367	06395843	0471701	0871499	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6221355	06208966	0042461	1210598	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6228324	05197614	050801	112398	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS AND CUSHMAN LLP	Yes
6228896	06930311	050801	0625998	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6228898	08776971	050801	0207797	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6229492	09444891	050801	1122998	130 WATER STREET, BOSTON, MA 02109, US	PETER J MANUS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6231955	09337454	0571501	0822199	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6232288	06051624	0571501	0471598	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6232445	06960190	051501	1029797	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6235222	09425395	0522201	1022999	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6235371	09456734	0522201	071999	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6235578	06913014	0522201	0670497	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6236568	09470066	0522201	1222999	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6238065	09277743	0522901	1207998	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6241774	09308556	050501	0520999	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6242196	06686494	060501	0725996	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6251523	09328427	062601	0671099	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6251861	09881878	062601	1171099	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6251948	09466028	062601	0660693	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6255498	09173918	070301	11071698	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6255967	09421208	070301	1020998	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
625887	06910539	071001	0773097	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6263039	09477312	071701	0170400	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6274235	09341088	0871401	0672099	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6274396	09559400	0871401	0672099	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6274639	09559422	082101	0573000	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6277643	09351119	082101	0710198	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6280773	09303953	0682801	0503998	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
62820794	09548998	050901	0471000	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6286514	09583161	0911101	0570000	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6286717	09422216	0911101	1102999	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6297375	09456703	100201	1209995	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6298880	10962119	1009091	0773099	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6300157	0943245	100901	1102998	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6306882	09547157	102301	061100	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6313343	09465207	110601	0710700	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6316198	09528115	111301	031800	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6321885	09319314	1122701	0802999	130 Water Street, Boston, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6335607	09412448	010102	1112498	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6342028	09230777	012902	030899	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6348586	09257069	021902	0322499	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6350560	09833539	027602	080700	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6352141	09555470	030502	053000	130 Water Street, Boston, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6362827	09808496	030502	080797	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6353105	09311441	030502	0571999	130 Water Street, Boston, MA 02109, US	GEORGE W NEUNER, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6338993	09428582	031902	1022999	130 Water Street, Boston, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6365148	09528554	040202	0471400	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6368713	09277708	040902	0318199	130 Water Street, Boston, MA 02109, US	DAVID G CONLIN, DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes
6372055	09511543	0471602	0322300	130 Water Street, Boston, MA 02109, US	S. Matthew Cairns, a/c/o Dike, Bronstein, Roberts & CUSHMAN LLP	Yes
6372560	09549593	0471602	0323100	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & CUSHMAN LLP	Yes
6379803	09230901	0472002	0203099	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN LLP	Yes

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638269	09409328	05070702	0127500	130 Water Street, Boston, MA 02109, US	S Mathew Cairns, Dike Bronstein Roberts & Cushman	
6391856	09511726	05121102	1171098	130 WATER STREET, BOSTON, MA 02109, US	GEORGE WENEUER, DIKE BRONSTEIN ROBERT &	
6408286	09460326	07171602	1211099	130 WATER STREET, BOSTON, MA 02109, US	S Mathew Cairns, CIO DIKE BRONSTEIN	
6420441	093826199	0813102	040401	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	
6433803	09532256	08221002	0322100	130 Water Street, Boston, MA 02109, US	David G Conlin, Dike Bronstein Roberts & Cushman LP	
6437635	09532256	08221002	0322100	130 Water Street, Boston, MA 02109, US	S MATTHEW CAIRNS, CIO DIKE BRONSTEIN	
6440642	09387301	08271702	0815199	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &	
6455233	094433153	08272402	1170399	130 WATER STREET, BOSTON, MA 02109, US	ROBERT F. O'CONNELL, DIKE, BRONSTEIN,	
			02050590	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, DIKE, BRONSTEIN, ROBERTS &	
			0571090	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, DIKE, BRONSTEIN,	
			0710292	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DAVID G. CONLIN, ESO., DIKE, BRONSTEIN,	
			07098238	130 WATER STREET, BOSTON, MA 02109, US	ATTN: DAVID G. CONLIN, ESO., DIKE, BRONSTEIN,	
			080507399	130 WATER STREET, BOSTON, MA 02109, US	DONALD BROWN, DIKE BRONSTEIN ROBERTS &	
			08246230	1228199	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE, BRONSTEIN ROBERTS &
			080654906	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE, BRONSTEIN ROBERTS &	
			080909515	130 WATER STREET, BOSTON, MA 02109, US	DAVID G CONLIN, DIKE, BRONSTEIN ROBERTS AND	
			08923155	09704497	130 WATER STREET, BOSTON, MA 02109, US	PETER J MANUS, DIKE, BRONSTEIN ROBERTS &
			08957388	1023197	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN, ROBERTS & CUSHMAN
			09073305	05050598	130 WATER STREET, BOSTON, MA 02109, US	LINDA M BUCKLEY, DIKE BRONSTEIN ROBERTS &
			091606310	0571198	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN, ROBERTS AND CUSHMAN
			09102446	0612298	130 WATER STREET, BOSTON, MA 02109, US	PETER J MANUS, DIKE BRONSTEIN ROBERTS &
			09120519	0712298	130 WATER STREET, BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS AND CUSHMAN
			09155635	0709999	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			09159028	0709998	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN, ROBERT & CUSHMAN
			09171545	0726699	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			092233864	0716199	130 WATER STREET, BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS AND CUSHMAN
			093006329	0427299	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			09320417	0561198	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN, ROBERT & CUSHMAN
			09347360	0706999	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			09360001	0723199	130 WATER STREET, BOSTON, MA 02109, US	ROBERT L GOLDBERG, DIKE BRONSTEIN ROBERTS &
			09372635	0571199	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			09413763	0617699	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN, ROBERTS & CUSHMAN
			094419354	1015199	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			09506210	1021199	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			095058594	10271700	130 WATER STREET, BOSTON, MA 02109, US	DIKE BRONSTEIN, ROBERTS & CUSHMAN
			095237176	0311100	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			095273367	0329190	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN
			095471829	0523199	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			094493833	0127100	130 Water Street, Boston, MA 02109, US	ROBERT L GOLDBERG, DIKE BRONSTEIN ROBERTS &
			094493833	0127100	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			09506210	0217100	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN, ROBERTS & CUSHMAN
			095058594	0217100	130 WATER STREET, BOSTON, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			095237176	0311100	130 Water Street, Boston, MA 02109, US	DIKE BRONSTEIN, ROBERTS & CUSHMAN
			095273367	0329190	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS &
			09542419	0614000	130 Water Street, Boston, MA 02109, US	ROBERT L GOLDBERG, DIKE BRONSTEIN ROBERTS &
			09546811	06471100	130 Water Street, Boston, MA 02109, US	PETER F CORLESS, DIKE BRONSTEIN ROBERTS & CUSHMAN
			095473941	06471100	130 Water Street, Boston, MA 02109, US	Christine C O'Day
			09551985	06471100	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman LLP
			095574433	0624200	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman LLP
			09560614	0626100	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman LLP
			09563672	0510200	130 WATER STREET, BOSTON, MA 02109, US	PETER F. CORLESS, DIKE, BRONSTEIN ROBERTS &
			095645198	0602500	130 Water Street, Boston, MA 02109, US	George W Neuner, Dike, Bronstein, Roberts & Cushman
			095648002	0602500	130 Water Street, Boston, MA 02109, US	Peter F Corless, Dike, Bronstein, Roberts & Cushman
			095661746	0691400	130 Water Street, Boston, MA 02109, US	EDWARDS & ANGEL LLP, Dike, Bronstein, Roberts &
			09672975	0628000	130 Water Street, Boston, MA 02109, US	Edwards & Angel, LLP

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09857598	053101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Robert & Cushman	Yes	Yes
09859089	051601	130 Water Street, Boston, MA 02109, US	David G Conlin, Dike, Bronstein, Roberts & Cushman	Yes	Yes
09869540	062101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09871168	0513101	130 Water Street, Boston, MA 02109, US	David G Conlin, Dike, Bronstein, Roberts & Cushman	Yes	Yes
09872135	0610101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09885312	0620101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09887595	0610501	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09816584	0610701	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09881279	0611011	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09881399	0611401	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09885312	0620201	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09887595	0610301	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09897387	0711801	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09907980	0711201	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09911118	0712301	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09915087	0712501	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09920383	0810101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09924698	0810501	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09925507	0810901	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09937796	0112902	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09943611	0815001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09950389	0910001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09952183	0911301	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09954288	0911701	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09954320	0911801	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09955827	0919101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09956894	1002001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09961812	0912401	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09964131	0912501	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09968148	1010101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09971207	1010401	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09974287	1011401	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09974418	1011601	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09975594	1011701	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09978115	1011801	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09979546	1112001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09980797	1114001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
09994024	1114101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10000239	1101001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10000533	1013101	130 WATER STREET, BOSTON, MA 02109, US	KEVIN J FOURNIER, DIKE BRONSTEIN ROBERTS & DIKE, BRONSTEIN, ROBERTS & CUSHMAN, LLP	Yes	Yes
10002849	1115001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10002952	1115001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10009158	1012501	130 Water Street, Boston, MA 02109, US	Dike, G Conlin, Dike, Bronstein, Robert & Cushman	Yes	Yes
10014311	1211101	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10023082	1211401	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10030568	0110402	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10033117	1012501	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10034659	1211901	130 Water Street, Boston, MA 02109, US	Peter F. Conless	Yes	Yes
10034885	1227701	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10035112	1228001	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10036184	1228601	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10037940	0110402	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10041002	0110602	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10045897	0111402	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes
10061645	0207102	130 Water Street, Boston, MA 02109, US	Dike, Bronstein, Roberts & Cushman, LLP	Yes	Yes

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4997165	07236505	0170190	08/21/88	BOSTON, MA 02109, US	ROBERT L. GOLDBERG, 130 WATER STREET	Yes	Yes
4905081	07118217	02/27/90	11/06/87	BOSTON, MA 02109, US	ROBERT F. O'CONNELL, 130 WATER STREET	Yes	Yes
4917777	07147864	04/17/90	01/25/89	BOSTON, MA 02109, US	ROBERT L. GOLDBERG, 130 WATER STREET	Yes	Yes
4932818	07434802	06/12/90	11/20/89	BOSTON, MA 02109, US	ROBERT L. GOLDBERG, 130 WATER ST.'	Yes	Yes
5020212	07528972	06/04/91	05/29/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS AND CUSHMAN, 130	Yes	Yes
5030380	07575447	07/09/91	08/28/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS AND CUSHMAN, 130	Yes	Yes
5037969	07532179	08/06/91	06/04/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5042481	07471406	08/27/91	07/29/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5043811	07536723	08/27/91	06/12/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5053318	07353570	10/01/91	05/18/89	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5065505	07593066	11/19/91	10/10/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5084726	07628891	01/28/92	12/14/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5093114	07622396	03/03/92	11/10/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5113842	07551701	05/19/92	04/28/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5121912	07630997	12/01/92	12/01/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5124779	07601245	06/23/92	10/17/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5126232	07355480	07/07/92	05/22/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5145840	07679236	01/08/92	04/02/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5147788	07622177	09/19/92	12/03/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5153222	07745439	10/06/92	05/14/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5179798	073735828	01/12/93	07/07/89	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5191376	07784579	03/02/93	10/29/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5201586	07857592	04/13/92	03/26/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5204765	07822360	04/20/93	01/17/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5206268	07394224	04/27/93	08/15/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5209753	07679085	05/11/93	05/28/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5213917	07810113	05/18/93	12/27/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5220686	07648890	01/25/93	03/17/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5225695	07636076	06/29/93	01/17/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5227695	07831209	07/06/93	02/07/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5227768	07755593	09/13/93	05/20/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5230768	07843500	07/27/93	02/28/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5238776	07661125	08/24/93	02/27/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5241107	05798125	08/31/93	11/14/85	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5245987	07822460	09/14/93	01/31/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5246958	07664053	09/21/93	03/04/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5253163	07530826	10/12/93	05/30/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5266440	08024799	11/20/93	03/01/93	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5272537	07739317	11/22/93	07/31/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5276297	07943067	01/04/94	05/10/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5280374	07843986	01/18/94	02/28/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5281331	07844295	01/25/94	02/28/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5286693	07798616	02/15/94	11/26/91	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5286803	07875938	02/15/94	04/24/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5286749	07597110	02/15/94	10/12/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5288313	07531156	02/12/94	10/01/90	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5290720	07955736	03/25/94	10/09/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5290945	07886100	04/05/94	05/10/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5302095	07893757	04/05/94	06/05/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5306109	07938158	04/26/94	11/30/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5306096	08065166	04/26/94	05/20/93	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5310423	07918133	05/10/94	07/22/92	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes
5312120	08077155	05/10/94	05/09/93	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes	Yes

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5314693	08012588	05/24/94	02/03/93	BOSTON, MA 02109, US
5317430	07987621	05/31/94	12/09/92	BOSTON, MA 02109, US
5321431	07798370	06/14/94	11/27/91	BOSTON, MA 02109, US
5321536	07998544	06/14/94	10/30/92	BOSTON, MA 02109, US
5331625	07948534	07/19/94	09/17/92	BOSTON, MA 02109, US
5336161	07983417	06/09/94	11/30/92	BOSTON, MA 02109, US
5343282	080989739	08/30/94	07/30/93	BOSTON, MA 02109, US
5342659	07821798	10/04/94	07/21/92	BOSTON, MA 02109, US
5356311	08037979	10/18/94	03/28/93	BOSTON, MA 02109, US
5357266	07849733	10/18/94	03/17/92	BOSTON, MA 02109, US
5362600	08078654	11/08/94	05/28/93	BOSTON, MA 02109, US
536646	08082548	11/22/94	06/28/93	BOSTON, MA 02109, US
5370880	08117985	12/06/94	09/08/93	BOSTON, MA 02109, US
5371745	07525092	12/05/94	05/17/90	BOSTON, MA 02109, US
5376134	08179273	12/27/94	12/28/93	BOSTON, MA 02109, US
5377865	08107395	01/03/95	09/17/93	BOSTON, MA 02109, US
5384233	08077669	01/24/95	01/22/93	BOSTON, MA 02109, US
5385536	08050612	01/31/95	05/03/93	BOSTON, MA 02109, US
5385846	08049551	01/31/95	02/23/93	BOSTON, MA 02109, US
5393646	07248795	09/26/95	07/26/91	BOSTON, MA 02109, US
539690	08195756	03/07/95	02/14/94	BOSTON, MA 02109, US
5396121	08135552	03/07/95	10/20/93	BOSTON, MA 02109, US
5396048	08110859	03/21/95	08/24/93	BOSTON, MA 02109, US
5400050	08153036	03/21/95	11/23/93	BOSTON, MA 02109, US
5400158	08097263	03/21/95	07/23/93	BOSTON, MA 02109, US
5404039	08072599	04/04/95	06/03/93	BOSTON, MA 02109, US
5410229	08086510	04/25/95	05/21/93	BOSTON, MA 02109, US
5416754	079895367	05/16/95	12/21/92	BOSTON, MA 02109, US
5418847	08198465	05/23/95	02/22/94	BOSTON, MA 02109, US
5422285	08067461	06/06/95	05/25/93	BOSTON, MA 02109, US
5423610	08142184	06/13/95	10/26/93	BOSTON, MA 02109, US
5426310	08059734	06/27/95	05/07/93	BOSTON, MA 02109, US
5430662	08165027	07/04/95	12/06/93	BOSTON, MA 02109, US
5433054	07923222	07/04/95	07/13/92	BOSTON, MA 02109, US
5434659	08288423	07/17/95	08/10/94	BOSTON, MA 02109, US
5443667	08198949	08/22/95	02/18/94	BOSTON, MA 02109, US
5446719	08015038	08/26/95	02/03/93	BOSTON, MA 02109, US
5448681	08233980	08/07/95	04/24/94	BOSTON, MA 02109, US
5451170	07747443	08/15/95	08/14/91	BOSTON, MA 02109, US
5441978	08012589	08/15/95	02/03/93	BOSTON, MA 02109, US
5443667	08198949	08/22/95	02/18/94	BOSTON, MA 02109, US
5446719	08015038	08/26/95	02/03/93	BOSTON, MA 02109, US
5447724	08122480	09/05/95	09/27/93	BOSTON, MA 02109, US
5447350	080504454	12/05/95	04/27/93	BOSTON, MA 02109, US
5448664	083066731	2/22/95	09/15/94	BOSTON, MA 02109, US
5448273	08273932	01/07/95	07/21/94	BOSTON, MA 02109, US
5448647	07924054	01/12/95	03/15/93	BOSTON, MA 02109, US
5448689	08141850	02/13/96	08/19/94	BOSTON, MA 02109, US
5450022	082993253	02/13/96	08/19/94	BOSTON, MA 02109, US
5494746	08227580	02/27/96	04/14/94	BOSTON, MA 02109, US
5495294	08199264	02/27/96	02/28/94	BOSTON, MA 02109, US
5502482	08217179	03/28/96	04/15/94	BOSTON, MA 02109, US
5527125	08215157	06/19/96	04/05/94	BOSTON, MA 02109, US
5527863	08346576	06/16/96	10/16/94	BOSTON, MA 02109, US
5534104	08244498	07/09/96	05/25/94	BOSTON, MA 02109, US
5545765	08244397	08/13/96	05/24/94	BOSTON, MA 02109, US
5545233	08244111	08/13/96	05/24/94	BOSTON, MA 02109, US

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5552910	08346473	0910296	112994	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5567738	08319817	1022986	0173195	BOSTON, MA 02109, US	DIKE BROWN, 130 WATER STREET	Yes
5572132	08515483	110596	0801595	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, LLP, 130	Yes
5574195	08346605	111296	1111694	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN, 130	Yes
5582816	08357781	1241096	121694	BOSTON, MA 02109, US	DONALD BROWN, 130 WATER STREET	Yes
5582933	08259345	121096	061474	BOSTON, MA 02109, US	GEORGE W. NEUNER, 130 WATER ST.	Yes
5583402	08452267	1217196	052695	BOSTON, MA 02109, US	DONALD BROWN, 130 WATER STREET	Yes
5590466	08403734	0114497	031595	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5599366	08445797	0204697	050495	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5608110	08299994	0226597	0501974	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN, 130	Yes
5623050	07932455	0412297	0818192	BOSTON, MA 02109, US	DIKE, BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5624974	08578872	0428987	1227795	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5633333	08265398	0619697	1228954	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes
5641654	08081072	062497	022293	BOSTON, MA 02109, US	DAVID G. CONLIN, 130 WATER ST.	Yes
5645720	084656042	0710897	0506959	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5647931	08507516	0715987	0822295	BOSTON, MA 02109, US	DONALD BROWN, 130 WATER STREET	Yes
5663401	08637222	0909897	042476	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
566671	08302818	091697	0509894	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5672176	08611991	093097	0305956	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5676640	08622667	1014497	032696	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5677114	08423691	1014497	041895	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5683119	08607681	102897	0216696	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5702451	08831149	1230937	1229957	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5712331	08671207	1127798	082896	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5716990	08495097	021098	0621785	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5728622	08262687	031098	0512795	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5728174	08632827	0317198	1103095	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5730925	08834171	0324798	041896	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5732324	08622008	0511998	032696	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5753319	08600598	051998	030895	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS CUSHMAN, 130 WATER ST.	Yes
5768094	08571995	0623198	121995	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5776727	08408222	0710798	032295	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5812206	07828806	092298	012492	BOSTON, MA 02109, US	DIKE, BRONSTIN, ROBERTS & CUSHMAN, 130	Yes
5814338	08671824	0928958	0711796	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5840833	08826469	112498	0402996	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN, 130	Yes
585407	08471557	122898	060795	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5876767	0808992	0302799	0213198	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5925001	08255202	0727099	0411794	BOSTON, MA 02109, US	DIKE, BRONSTIN, ROBERTS & CUSHMAN, 130	Yes
5942231	08864820	082499	0618196	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5952308	07911933	0914499	072492	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN, 130	Yes
595491	08493532	0921799	0621795	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5962570	08764691	121396	100599	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
598392	08572333	110999	1214495	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
5988874	08620285	1123998	032296	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS AND CUSHMAN, 130	Yes
6045790	07939016	0404096	0501792	BOSTON, MA 02109, US	DONALD BROWN, 130 WATER STREET	Yes
6080556	08857788	0621700	030998	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
6171576	08552284	0109001	110395	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
6211859	07737342	0411701	091091	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes
6213304	07323042	031089	0512790	BOSTON, MA 02109, US	DIKE BRONSTEIN ROBERTS & CUSHMAN, 130	Yes
6213183	07311383	0622869	0308951	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes
6215928	07519280	0405790	0912492	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes
6215809	07580105	0715980	051090	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes
6215813	07581193	0911290	0512790	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes
6215817	07754287	0803091	0510905	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes
6215819	07925949	080592	092492	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes
6215821	07927114	092492	051090	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130	Yes

**COPY**

08027881	08288765	03085933	BOSTON, MA 02109, US	PETER J. MANULIS, 130 WATER STREET, BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
08288888	08428750	08282992	0202790	BOSTON, MA 02109, US	DONALD BROWN, ESQUIRE, 130 WATER STREET, BOSTON, MA 02109, US	YES
D348217	07883356	1222993	051492	BOSTON, MA 02109, US	DONALD BROWN, 130 WATER ST.	YES
D348528	07883380	041294	060492	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS, CUSHMAN, 130 WATER ST.	YES
D348528	07724556	1221794	0710291	BOSTON, MA 02109, US	DAVID BROWN, 130 WATER ST.	YES
RE35901	08309858	0519198	092094	BOSTON, MA 02109, US	DAVID G CONLIN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5413905	08132663	0509595	100693	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5433582	08116675	0711995	0711994	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5433582	08040451	08042858	0607995	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5455412	082233691	100395	0428794	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5462085	08147775	1031795	110593	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5508190	08404642	041696	0311995	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5512645	08543540	0413096	1122994	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5530030	08327717	0625956	1021994	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5530030	08338357	070096	121695	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5552494	08503675	0910986	0711695	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5610905	08592875	0311197	030395	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5610905	08287131	0410097	0806934	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5633956	08282668	0529787	025994	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
56540210	084359702	0511797	051295	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5659891	08346094	11205937	1128994	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5788414	08403686	0721995	0410795	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5863874	08545931	1117198	0326956	BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4939593	08582282	0117486	122882	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4939593	07203329	0117486	060798	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4976681	071767053	1211190	0422788	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5250036	07980673	1005933	1172992	BOSTON, MA 02451, US	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02451, US	YES
4550452	165575072	11105955	01150984	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4550452	08545931	1117198	0326956	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4550452	08582282	0117486	122882	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4976681	071767053	1211190	0422788	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5133919	071713305	08040492	0325988	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5255769	06774811	10269533	09111795	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
5255769	0729965	0719198	1017988	CUSHMAN & PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4744073	06806038	0422698	1209985	CUSHMAN & PFUND, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4746432	06816814	0819888	0107986	CUSHMAN & PFUND, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4895016	07126568	1212699	0117987	CUSHMAN & PFUND, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4849350	06784844	0711809	1010485	CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4963426	07206137	10116950	06113988	CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4954063	09554063	0226500	0226500	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, P.O. BOX 9169, BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
4954063	09862893	1111301	0817900	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, P.O. BOX 9169, BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
49662846	096622846	0770701	0770701	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA 02109, US	YES
49666152	09666152	0920900	0920900	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
49786309	09786309	0610501	0610501	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
49787196	09787196	0428001	0428001	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09860603	09860603	0611501	0611501	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09866633	09866633	0330001	0330001	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09870215	09870215	0512000	0512000	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09872837	09872837	0410101	0410101	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09778848	09778848	1201000	1201000	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09886633	09886633	0211601	0211601	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09785494	09785494	0753008	0753008	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09785771	09785771	0921402	0921402	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09860671	09860671	0610101	0610101	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09866633	09866633	0711301	0711301	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09870215	09870215	0512000	0512000	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09872836	09872836	0211601	0211601	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09785494	09785494	0753008	0753008	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES
09785771	09785771	0921402	0921402	DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	ROBERT T. GAMMONS, ESQ., DIKE, BRONSTEIN, ROBERTS & CUSHMAN, 130 Water Street, Boston, MA 02109, US	YES

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09728822	1129500	Edwards & Angel, LLP, 130 Water Street, Boston, MA 02109,	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
09758906	01111001	Edwards & Angel, LLP, 130 Water Street, Boston, MA 02109,	Dike, Bronstein, Roberts & Cushman, LLP, Intellectual	Yes	Yes	
09809907	03116001	EDWARDS & ANGELL, LLP, 130 Water Street, Boston, MA	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	No	
09785796	1106001	EDWARDS & ANGELL, LLP, 130 Water Street, Boston, MA	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
63132099B2	09198397	EDWARDS & ANGELL, LLP, 130 Water Street, Boston, MA	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
63230662	1127001	EDWARDS & ANGELL, LLP, 130 Water Street, Boston, MA	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
09752102	1229000	EDWARDS & ANGELL, LLP, 130 Water Street, Boston, MA	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
09834313	04113001	EDWARDS & ANGELL, LLP, 130 Water Street, Boston, MA	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
09803358	03110001	Intellectual Property Patent Practice, 130 Water Street, Boston,	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
09812817	03120001	Intellectual Property Practice Group, 130 Water Street, Boston,	EDWARDS & ANGELL, LLP, Dike, Bronstein, Roberts &	Yes	Yes	
09815257	03122001	Intellectual Property Practice Group, 130 Water Street, Boston,	EDWARDS & ANGELL, LLP, Dike, Bronstein, Roberts &	Yes	Yes	
09830646	04127001	Intellectual Property Practice Group, 130 Water Street, Boston,	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
10049305	02105002	Intellectual Property Practice Group, 130 Water Street, Boston,	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
09879482	1004900	Intellectual Property Practice Group, 130 Water Street, Boston,	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
09880504	10105000	Intellectual Property Practice Group, 130 Water Street, Boston,	EDWARDS & ANGELL, LLP, Dike, Bronstein, Roberts &	Yes	Yes	
09822768	03135001	Intellectual Property Practice Group, 130 Water Street, Boston,	EDWARDS & ANGELL, LLP, Dike, Bronstein, Roberts &	Yes	Yes	
10069360	02280002	Intellectual Property Practice Group, 130 Water Street, Boston,	Dike, Bronstein, Roberts & Cushman, Intellectual	Yes	Yes	
09830706	08107001	Intellectual Property Practice Group, 130 Water Street, Boston,	George W. Neuner, Edward & Angel, LLP, 130 Water	Yes	Yes	
09769391	01250001	Int. Prop. Practice Group, Edwards & Angel, LLP, 130 Water	Int. Prop. Practice Group, Edwards & Angel, LLP, 130 Water	Yes	Yes	
09806102	10171502	P Group of Edwards & Angel, 130 Water Street, Boston, MA	P Group of Edwards & Angel, 130 Water Street, Boston, MA	Yes	Yes	
10070511	03105002	P Group of Edwards & Angel, 130 Water Street, Boston, MA	P Group of Edwards & Angel, 130 Water Street, Boston, MA	Yes	Yes	
09916399	07150001	P Group of Edwards & Angel, 130 Water Street, Boston, MA	P Group of Edwards & Angel, 130 Water Street, Boston, MA	Yes	Yes	
09861808	09240001	IP Group of EDWARDS & ANGELL, LLP, 130 Water Street,	Peter F. Corless, Dike Bronstein Roberts & Cushman	Yes	Yes	
10119029	07103002	P.O. Box 9163, Marlborough, MA 01752, US	David G. Conlin, Dike, Bronstein Roberts & Cushman	Yes	Yes	
4751106	06911453	05114088	PFUND 130 WATER ST., BOSTON, MA 02109, US	Peter F. Corless, Dike Bronstein Roberts & Cushman	Yes	Yes
44933460	06450561	11207004	PFUND 130 WATER ST., BOSTON, MA 02109, US	Peter F. Corless, Dike Bronstein Roberts & Cushman	Yes	Yes
45824488	068504923	04115006	PFUND, 130 WATER ST., BOSTON, MA 02109, US	Peter F. Corless, Dike Bronstein Roberts & Cushman	Yes	Yes
4764191	07104275	08141608	PFUND, 130 WATER ST., BOSTON, MA 02109, US	Peter F. Corless, Dike Bronstein Roberts & Cushman	Yes	Yes
4835102	070732848	05130009	PFUND, 130 WATER ST., BOSTON, MA 02109, US	Peter F. Corless, Dike Bronstein Roberts & Cushman	Yes	Yes
4931046	07314297	06102760	PFUND, 130 WATER ST., BOSTON, MA 02109, US	S. Matthew Cairns, c/o Dike, Bronstein, Roberts &	Yes	Yes
4940750	071253060	07110500	PFUND, 130 WATER ST., BOSTON, MA 02109, US	S. Matthew Cairns, c/o Dike, Bronstein, Roberts & Cushman	Yes	Yes
4982319	07245397	08120000	PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
5852177	073011460	12122008	PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
4775487	065100053	04050008	PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
4837379	07201505	06060009	PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
4831216	072025022	08101009	PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
491836	07065524	11003009	PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
4877050	07264336	10131009	PFUND, 130 WATER ST., BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
4907232	07187474	03060000	PFUND, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
4986700	07081645	09111000	PFUND, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
5018249	06595985	04116001	PFUND, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
592610	07054102	02120000	PFUND, 130 WATER STREET, BOSTON, MA 02109, US	ROBERT L. GOLDBERG, ESQ., Dike, Bronstein, Roberts & Cushman	Yes	Yes
5210871	07561362	10511003	ROBERTS & CUSHMAN, 130 WATER STREET, BOSTON, MA	ROBERT F. O'CONNELL, Dike, Bronstein,	Yes	Yes

**COPY**

**Practitioner's Docket No. 55,750 (45672)  
PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: T. Adachi, et al.

Application No.: 09/820021 Group No.: Unassigned

Filed: March 28, 2001 Examiner: Unassigned

For: LIQUID CRYSTAL DISPLAY DEVICE

**Assistant Commissioner for Patents  
Washington, D.C. 20231**

**TRANSMITTAL OF CERTIFIED COPY**

Attached please find the certified copy of the foreign application from which priority is claimed for this case:

Country:	Japan	Country	Japan
Application No:	2000-091832	Application No.	2000-096765
Filing Date:	3/29/2000	Filing Date	3/31/2000
Country	Japan	Country	Japan
Application No.	2001-032773	Application No.	2001-038246
Filing Date	2/8/2001	Filing Date	2/15/2001

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**CERTIFICATE OF MAILING (37 C.F.R. 1.8a)**

I hereby certify that this correspondence is, on the date shown below, being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Signature

Date: May 7, 2001

Kathryn A. Grindrod  
Kathryn A. Grindrod

T. Adachi, et al.  
USSN: 09/820021  
Page 2

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Customer No.: 21874

David A. Tucker  
**SIGNATURE OF PRACTITIONER**  
David A. Tucker  
Reg. No. 27,840

Dike, Bronstein, Roberts & Cushman  
Intellectual Property Practice Group  
EDWARDS & ANGELL, LLP  
P.O. Box 9169  
Boston, MA 02209  
Tel. No.: (617) 523-3400  
164172

日本特許庁

PATENT OFFICE  
JAPANESE GOVERNMENT

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別紙添付の書類に記載されている事項は下記の出願書類に記載されて  
いる事項と同一であることを証明する。  
This is to certify that the annexed is a true copy of the following application as filed  
with this Office.

出願年月日  
Date of Application:

2000年 3月29日

出願番号  
Application Number:

特願2000-091832

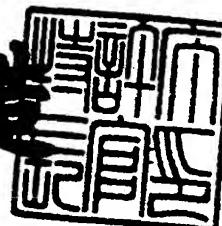
申請人  
Applicant(s):

シャープ株式会社

2001年 1月12日

特許庁長官  
Commissioner,  
Patent Office

及川耕造



出証番号 出証特2000-3111577

日本国特許庁  
PATENT OFFICE  
JAPANESE GOVERNMENT

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別紙添付の書類に記載されている事項は下記の出願書類に記載されて  
る事項と同一であることを証明する。  
This is to certify that the annexed is a true copy of the following application as filed  
with this Office.

出願年月日  
Date of Application:

2000年 3月31日

出願番号  
Application Number:

特願2000-096765

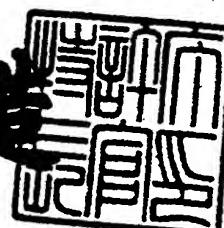
願人  
Applicant(s):

シャープ株式会社

特許庁長官  
Commissioner,  
Patent Office

2001年 1月12日

及川耕造



出証番号 出証特2000-3111578

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出願年月日  
Date of Application:

2001年 2月 8日

願番号  
Application Number:

特願2001-032773

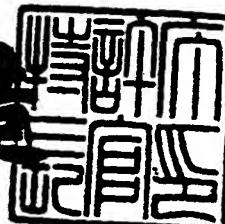
願本人  
Applicant (s):

シャープ株式会社

2001年 3月 9日

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出証番号 出証特2001-3016361

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with this Office.

出願年月日  
Date of Application:

2001年 2月15日

出願番号  
Application Number:

特願2001-038246

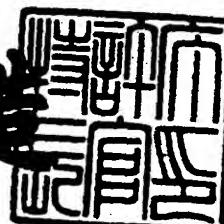
出願人  
Applicant(s):

シャープ株式会社

2001年 3月16日

特許庁長官  
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出証番号 出証特2001-3018443

**COPY**

Attorney Docket No. 55,750 (45672)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICANT: T. Adachi, et al.

U.S.S.N.: Unassigned

Art Unit: Unassigned

FILED: Herewith

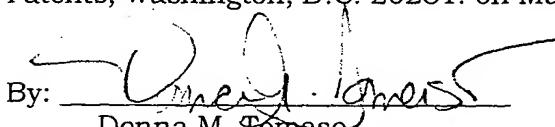
Examiner: Unassigned

FOR: LIQUID CRYSTAL DISPLAY DEVICE

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**CERTIFICATE OF EXPRESS MAILING**

I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 (Express Mail Label No. EL730721694US), and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231, on March 28, 2001

By:   
Donna M. Tomase

.....

**INFORMATION DISCLOSURE STATEMENT  
(SUBMISSION AFTER FILING OF AN APPLICATION  
BUT BEFORE FINAL REJECTION OR NOTICE OF ALLOWANCE)**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Date: March 28, 2001

Sir:

Pursuant to 37 C.F.R. §§ 1.97 and 1.98, Applicant(s) hereby submit(s) an Information Disclosure Statement for consideration by the Examiner.

**I. LIST OF PATENTS, PUBLICATIONS OR OTHER INFORMATION**

The patents, publications or other information submitted for consideration by the Office are listed on PTO-1449, attached hereto.

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a. X Submitted herewith is a legible copy of (i) each U.S and foreign patent; (ii) each publication or that portion which caused it to be listed; and (iii) all other information or that portion which caused it to be listed.

b.        Each of the patents, publications or other information listed on the attached PTO-1449 was previously cited by or submitted to the USPTO in connection with U.S.S.N.: 08/000,000, to which the subject application claims the benefit of the earlier filing date. As such, a copy of each is not included herewith pursuant to 37 C.F.R. § 1.98(d).

### III. CONCISE EXPLANATION OF THE RELEVANCE

(check at least one box)

a. X Except as may be indicated below in (b), all of the patents, publications or other information are in the English language or were cited in an English language Search Report, a copy of which is attached hereto (concise explanation not required).

b. . X A concise explanation of the relevance of all patents, publications or other information listed that is not in the English language is as follows:

English translation for reference(s) \_\_\_\_\_.  
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 English translation of search report/ official communication.  
 Copy of PCT/EPO Search Report.  
Reference BA also referred to in background of subject application.

c. \_\_\_\_\_ The following additional information is provided for the Examiner's consideration:

- Copy of EPO Search Report.
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**FEES**

IV. **THIS IDS IS BEING FILED UNDER 37 C.F.R. § 1.97(b)**  
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- a. X within three months of the filing date of a national application (37 C.F.R. § 1.97(b) (1)). No fee or certification is required.
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V. **THIS IDS IS BEING FILED UNDER 37 C.F.R. § 1.97(c):**  
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before the mailing date of a Final Office Action under 37 C.F.R. § 1.113 (See 37 C.F.R. § 1.97(c) (1)) or before the mailing date of a Notice of Allowance under 37 C.F.R. § 1.311 (See 37 C.F.R. § 1.97(e) (2)).

- a. \_\_\_\_\_ No certification; therefore, a fee in the amount of \$230.00 is required by 37 C.F.R. § 1.17(p).  
or
- b. \_\_\_\_\_ See the certification below. No fee is required.

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**VI. CERTIFICATION UNDER 37 C.F.R. § 1.97(e) (check only one box)**

The undersigned hereby certifies that

- a.        each item of information contained in the IDS was cited in a communication from a foreign Patent Office in a counterpart foreign application not more than three months prior to the filing of this IDS; or
- b.        no item of information contained in the IDS was cited in a communication from a foreign Patent Office in a counterpart foreign application or, to the best of my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this statement.
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**VII. FEES PAYMENT (check one)**

- Enclosed please find a check in the amount of \$230.00 for the above-indicated fee.
- Please charge Deposit Account No. 04-1105 in the amount of \$230.00 for the above-indicated fee.
- X       No fee is required.

Attorney Docket No. 55,750 (45672)  
T. Adachi, et al.  
Page 5

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If the Examiner has any questions concerning this IDS, he/she is requested to contact the undersigned. If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule, with a petition if necessary, and charge the appropriate fee to Deposit Account No. 04-1105.

Respectfully submitted,

Date: March 28, 2001

David A. Tucker  
David A. Tucker (Reg. No. 27,840)

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<b>Information Disclosure Statement</b>  <b>PTO - 1449</b>	Atty. Docket No. 55,750 (45672)	Serial No. Unassigned
	Applicant(s): Takako ADACHI	
	Filing Date Herewith	Art Unit Unassigned

**UNITED STATES PATENT DOCUMENTS**

Exam. Initials	Ref. No.	Document Number	Date	Name	Class	File Date
	AA	USSN: 09/632,878				8/4/2000

**FOREIGN PATENT DOCUMENTS**

Exam. Initials	Ref. No.	Document Number	Date	Country or Office	Class
	BA	04288589 A	10/1992	JAPAN	

**OTHER DOCUMENTS (INCL. TITLE, AUTHOR, DATE, PAGES, ETC)**

Exam. Initials	Ref. No.	

Examiner:	Date:
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(19)



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PATENT ABSTRACTS OF JAPAN

(11) Publication number: 0428859 A

(43) Date of publication of application: 13 . 10 . 92

(51) Int. Cl

**G09G 3/36**  
**G02F 1/133**  
**H04N 5/66**

(21) Application number: 03150577

(71) Applicant: TOSHIBA CORP

(22) Date of filing: 21 . 06 . 91

(72) Inventor: OKUMURA HARUHIKO  
FUJIWARA HISAO  
ITAKURA TETSURO

(30) Priority: 03 . 09 . 90 JP 02232821

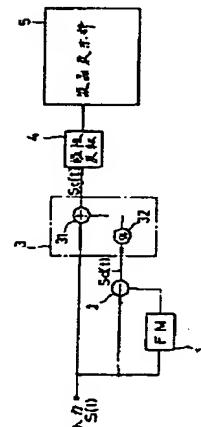
(54) LIQUID CRYSTAL DISPLAY DEVICE

(57) Abstract:

PURPOSE: To offer the liquid crystal display device equipped with a driving circuit which realize a response speed nearly as fast as or faster than that of a binary display even with a half-tone level.

CONSTITUTION: An image storage circuit 1 which holds at least one field image of an input image signal is provided, and a time base filter circuit 3 detects level variation of each picture element in the time-base direction from the image signal held in the storage circuit 1 and the input image signal and performs high-frequency emphasized filtration in the time-base direction of each picture element for the input image signal according to the detection output. Consequently, the response characteristics of the liquid crystal display device are improved, the response speed of a half-tone display is made fast, and high picture quality with a reduced after-image is obtained.

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(19) 日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平4-288589

(43) 公開日 平成4年(1992)10月13日

(51) Int.Cl.<sup>5</sup> 識別記号 廷内整理番号 F I 技術表示箇所  
G 0 9 G 3/36 7926-5G  
G 0 2 F 1/133 5 7 5 7820-2K  
H 0 4 N 5/66 1 0 2 B 7205-5C

審査請求 未請求 請求項の数 8 (全 14 頁)

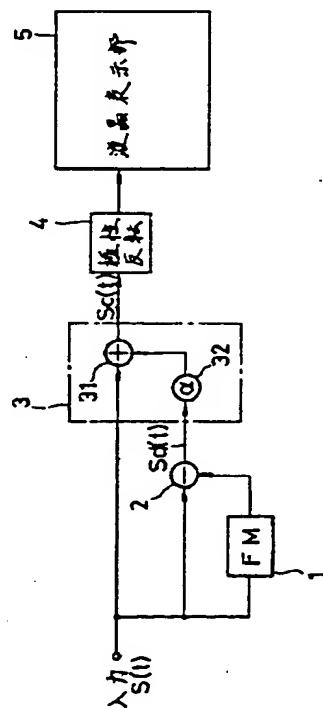
(21)出願番号	特願平3-150577	(71)出願人	000003078
(22)出願日	平成3年(1991)6月21日		株式会社東芝
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		(74)代理人	弁理士 鈴江 武彦

(54) 【発明の名称】 液晶表示装置

(57) 【要約】

【目的】 中間調レベルでも二値表示なみ若しくはそれ以上の応答速度を実現し得る駆動回路を備えた液晶表示装置を提供することを目的とする。

【構成】入力画像信号の少くとも一枚のフィールド画像を保持する画像用記憶回路1を備え、この記憶回路1に保持された画像信号と入力画像信号とから各画素の時間軸方向のレベル変動を検出して、その出力に応じて入力画像信号の各画素の時間軸方向に高域強調フィルタをかける時間軸フィルタ回路3を設けることにより、液晶表示装置の応答特性を改善し、特に中間調表示での応答速度を高速化して残像を低減した高画質を得る。



## 【特許請求の範囲】

【請求項1】入力画像信号の少くとも一枚のフィールド画像を保持する画像用記憶回路と、この記憶回路に保持された画像信号と前記入力画像信号とから各画素の時間軸方向のレベル変動を検出するレベル変動検出回路と、この検出回路の出力に応じて前記入力画像信号の各画素の時間軸方向に高域強調フィルタをかける時間軸フィルタ回路と、この時間軸フィルタ回路の出力信号が供給される液晶表示部と、を備えたことを特徴とする液晶表示装置。

【請求項2】前記時間軸フィルタ回路は、前記レベル変動検出回路の出力と前記入力画像信号の各画素の入力レベルによりフィルタ特性が変化させられる適応型フィルタ回路であることを特徴とする請求項1記載の液晶表示装置。

【請求項3】前記時間軸フィルタ回路は、前記各画素の時間軸方向のレベル変動の極性に応じて異なる特性を持つことを特徴とする請求項1記載の液晶表示装置。

【請求項4】入力画像信号の少くとも一枚のフィールド画像を保持する画像用記憶回路と、この記憶回路に保持された画像信号と前記入力画像信号とから各画素の時間軸方向のレベル変動を検出するレベル変動検出回路と、この検出回路の出力に応じて前記入力画像信号の各画素の時間軸方向に高域強調フィルタをかける時間軸フィルタ回路と、この時間軸フィルタ回路の出力信号が供給される液晶表示部と、この液晶表示部の液晶温度を検出して、その検出出力に応じて前記時間軸フィルタの特性を可変制御する液晶温度検出回路と、を備えたことを特徴とする液晶表示装置。

【請求項5】入力画像信号の少くとも一枚のフィールド画像を保持する画像用記憶回路と、この記憶回路に保持された画像信号と前記入力画像信号とから各画素の時間軸方向のレベル変動を検出するレベル変動検出回路と、前記入力画像信号の中で動いている部分を検出する動き検出回路と、前記レベル変動検出回路および動き検出回路の出力に応じて前記入力画像信号の各画素の時間軸方向に高域強調フィルタをかける時間軸フィルタ回路と、この時間軸フィルタ回路の出力信号が供給される液晶表示部と、を備えたことを特徴とする液晶表示装置。

【請求項6】入力画像信号の少くとも一枚のフィールド画像を保持する画像用記憶回路と、この記憶回路に保持された画像信号と前記入力画像信号とから各画素の時間軸方向のレベル変動を検出するレベル変動検出回路と、前記入力画像信号の中で動いている部分を検出する動き検出回路と、前記レベル変動検出回路および動き検出回路の出力に応じて前記入力画像信号の各画素の時間軸方向に高域強調フィルタをかける時間軸フィルタ回路と、この時間軸フィルタ回路の出力信号が供給される液晶表示部と、この液晶表示部の液晶温度を検出して、その検出出力に応じて前記時間軸フィルタの特性を可変制御す

る液晶温度検出回路と、を備えたことを特徴とする液晶表示装置。

【請求項7】前記液晶温度検出回路は、前記液晶表示部を複数個に分割した小画面毎に温度検出を行い、各小画面の温度検出出力により前記時間軸フィルタの特性を最適制御することを特徴とする請求項4または6に記載の液晶表示装置。

【請求項8】前記入力画像信号の雑音除去を行う雑音除去フィルタが設けられていることを特徴とする請求項10, 4, 5または6のいずれかに記載の液晶表示装置。

【発明の詳細な説明】 【発明の目的】

【0001】

【産業上の利用分野】本発明は、液晶表示装置に係り、とくに中間調表示の応答特性を考慮した駆動回路部の改良に関する。

【0002】

【従来の技術】一般に液晶の応答速度は、液晶分子が印加された電界によって立ち上がる速度  $t_r$  と、電界を零にしたときに各分子間の力によって元の状態に復帰する速度  $t_d$  により決まる。これらの速度  $t_r$ ,  $t_d$  は以下の式で表される。

$$t_r = \eta d^2 / (\Delta \epsilon V - K \pi^2) \quad \dots (1)$$

$$t_d = \eta d^2 / K \pi^2 \quad \dots (2)$$

【0003】ここに、Kは、液晶の発散、ねじれ、曲げの弾性定数をそれぞれ  $K_1$ ,  $K_2$ ,  $K_3$  としたときに、 $K = K_1 + (K_3 - 2K_2) / 4$  で表される定数である。 $\Delta \epsilon$  は、液晶分子の長軸方向の誘電率  $\epsilon_s$  と短軸方向の誘電率  $\epsilon_p$  の差  $\epsilon_s - \epsilon_p$  である。 $\eta$  は液晶分子のねじれ粘性、dは液晶セルの厚み(セルギャップ)、Vは印加電圧である。

【0004】(1), (2)式から明らかなように、液晶の応答速度を速めるには、 $\eta$ , dを小さくするか、またはKを大きくすればよい。ただし、 $\eta$ , Kは物質定数であり、dは屈折率の異方性である $\Delta n$ との兼ね合いで最小透過率が決まってくるので、それ程小さくすることはできない。そこで種々の液晶物質のブレンドによって $\eta$ , K,  $\Delta n$ 等を変化させて高速応答を実現する努力が続けられている。また、立ち上がり速度  $t_r$  については、 $\Delta \epsilon$  またはVを変化させることにより高速化することができ、立ち下がり速度  $t_d$  については、誘電率の異方性が低周波では正、高周波では負であることを利用して、電圧OFF時に高周波を重畠して高速化した例が知られている。

【0005】以上のような液晶応答速度の改善は、ON/OFFの二値表示の場合有効であるが、中間調表示を考慮した場合には状況は複雑になる。その事情を図面を参照して以下に説明する。

【0006】図19は電極41, 42間の一つの液晶分子43を示している。液晶分子43は、x軸に対して $\theta$ 、x軸に対して $\phi$ 傾いており、この状態で液晶分子4

3

3に $z$ 軸方向の電界がかかったときの流体力学方程式 \*【0007】  
は、 \*【数1】

$$\begin{aligned} \tau_1 \cdot \partial \theta / \partial t &= f(\theta) (\partial^2 \theta / \partial z^2) \\ &+ (f(\theta) \partial \theta / \partial z) / \partial z \\ &+ g(\theta) (\partial \phi / \partial z)^2 \\ &+ e(\theta) (\partial \phi / \partial z) \\ &+ h(\theta) Dz^2 / 4\pi \quad \dots (3) \end{aligned}$$

$$\tau_1 \cdot \partial \phi / \partial t = (1/\cos^2 \theta) \cdot (u(\theta) (\partial \theta / \partial z) + v(\theta)) / \partial z \quad \dots (4)$$

【0008】で記述される。上式は非線形偏微分方程式であり、解析的に解くことは出来ないが、数値計算により解くことができる。また電極間に印加される入力電圧※

※Vは、 $a = (\epsilon_s - \epsilon_p) / \epsilon_p$  として、

【0009】

【数2】

$$V = (Dz / \epsilon_p) \int_0^d dz / (1 + a \sin^2 \theta) \dots (5)$$

で表される。 $Dz$  は電束密度である。

【0010】以上の(3)～(5)式を連立して解くことにより、入力電圧変化による液晶分子の過渡応答特性を求めることができる。これらの式から、液晶分子の時間的变化量は、入力電圧に依存することが分かる。この様にして求められた液晶分子の時間的变化量 $\theta$  ( $z$ ,  $t$ ) および $\phi$  ( $z$ ,  $t$ ) をBarrmanの $4 \times 4$ マトリクスに入れて解くことにより、最終的な光学応答特性を導出することができる。

【0011】一方、図20は液晶の透過率-入力電圧特性を示している。この特性から、通常、 $100/1$ のコントラスト比をとるためには、ノーマリ・ホワイトの場合で5V程度の入力振幅を必要とするが、中間調レベルだけを考えると、振幅は1.5～2Vになる。以上のこととは、中間調レベル表示においては、応答速度が二値表示の場合より遅くなることを示している。このことは、液晶をTV等のフルカラー表示に用いた場合問題になる。

【0012】すなわち液晶表示装置をTV等のフルカラー表示に用いる場合、中間調レベルでの応答速度を10msec程度にする必要があるが、現状は三値表示でも20msec程度にしかなっていない。このため、動画表示には著しく残像が目立ち、高画質が得られない。

【0013】

【発明が解決しようとする課題】以上のように従来の液晶表示装置では、中間調レベルでの応答速度が十分でなく、TV等のフルカラー表示に用いた場合に高画質が得られないという問題があった。

【0014】本発明はこの様な点に鑑みなされたもの

で、中間調レベルでも二値表示なみ若しくはそれ以上の応答速度を実現し得る駆動回路を備えた液晶表示装置を提供することを目的とする。

【発明の構成】

【0015】

【課題を解決するための手段】本発明にかかる液晶表示装置は、入力画像信号の少くとも一枚のフィールド画像を保持する画像用記憶回路を備え、この記憶回路に保持された画像信号と入力画像信号とから各画素の時間軸方向のレベル変動を検出して、その出力に応じて入力画像信号の各画素の時間軸方向に高域強調フィルタをかける時間軸フィルタ回路を設けたことを特徴とする。

【0016】

【作用】本発明によれば、液晶分子の応答速度が遅い場合でも、入力画像信号の高域成分を予め持ち上げるという処理を行って液晶部に供給することにより、応答の立ち上がり、たち下がりを高速化することができる。したがって特に中間調レベルでの応答速度が改善され、TV等のフルカラー表示に用いて高画質を得ることができる。

【0017】

【実施例】以下、本発明の実施例を説明する。

【0018】図1は第1の実施例の要部構成を示す。図の入力画像信号 $S(t)$ は、ビデオ信号をR, G, Bに分解した後の信号であるが、R, G, B信号に対して同じ処理になるので、ここではそのうちの1チャネルのみ示している。入力画像信号 $S(t)$ は、少なくとも1フィールド分の画像信号を記憶する画像用記憶回路1に保持される。差分器2は、入力画像信号 $S(t)$ と画像用

記憶回路1とから、対応する各画素信号の差をとるもので、1フィールドの間の信号レベルの変化を検出するレベル変化検出回路となっている。この差分器2から得られる時間軸方向の差信号Sd(t)は、入力画像信号S(t)と共に時間軸フィルタ回路3に入力される。

【0019】時間軸フィルタ回路3は、差信号Sd(t)に応答速度に応じた重み係数 $\alpha$ をかける重み付け回路32と、重み付けられた差信号と入力画像信号S(t)を加算する加算器31とから構成されている。これはレベル変動検出回路の出力と入力画像信号の各画素の入力レベルによりフィルタ特性が変化させられる適応型フィルタ回路である。この時間軸フィルタ回路3によって入力画像信号S(t)は時間軸方向の高域が強調される。こうして得られた高域強調信号は、極性反転回路4によって交流信号に変換されて液晶表示部5に供給される。液晶表示部5は、複数本のデータ信号配線とこれと交差する複数本の駆動信号配線の各交差部に表示電極を持つ、アクティブマトリクス方式の液晶表示部である。

【0020】図2はこの実施例により、応答特性が改善される様子を示す信号波形である。説明を分かり易くするため入力画像信号S(t)が1フィールド周期で変化するものとし、図では2フィールドで信号レベルが急激に変化している場合を示している。この場合時間軸方向の入力信号変化すなわち差信号Sd(t)は図に示すように、入力画像信号が正に変化するときに1フィールド間正になり、負に変化するときに1フィールド間負になる。基本的にはこの差信号を入力信号に加えることにより、高域強調ができる。しかしながら実際には、液晶の応答速度によって入力信号変化がどの程度液晶セルの透過率変化になるかが変わってくるので、オーバーシュートが生じない範囲で補正するように重み係数 $\alpha$ をかける。これにより図示のような高域が補正された信号Sc(t)が得られる。この様に高域が強調される信号が液晶表示部に入力されることにより、光学応答特性I(t)は、破線で示す従来のものに対して実線で示すように改善される。

【0021】具体的には、図3に示すように液晶の伝達関数を $HLCD(\omega t)$ とすると、高域強調関数 $Hc(\omega t)$ が掛けられた後の周波数特性 $Ht(\omega t)$ は以下のようになる。

$$Ht(\omega t) = HLCD(\omega t) \cdot Hc(\omega t)$$

$$Hc(\omega t)$$

$$= \alpha \{ 1 - \exp (j \cdot 2\pi \omega t / \omega_c) \} + 1$$

$$\omega_c = 2\pi / 60$$

【0022】すなわちこの実施例では、 $Ht(\omega t)$ が広帯域化できるように、 $HLCD(\omega t)$ が低下するところを $Hc(\omega t)$ により補償することになる。実際にこの特性を求め、或いは重み係数 $\alpha$ を決めるためには、従来技術で説明した液晶分子のダイナミック特性を記述す

る式(3)～(5)を $\alpha$ をパラメータとして解いていくことになる。

【0023】図4は第2の実施例の要部構成を示す。なお以下の実施例では図1と対応する部分に図1と同一符号を付して詳細な説明は省略する。従来技術で説明したように液晶の応答速度は、立上がりと立ち下がりとで異なるのが通常である。そこで入力の変化が立上がり方向の変化であるか、立ち下がり方向の変化であるかを検出して、それぞれの場合で高域強調量を異ならせる方法が考えられる。これを実現したのが第2の実施例である。

【0024】すなわちこの実施例では、二つの重み付け回路321と322を設け、フィールド間差分が正の場合(つまり立上がりの時)は、高域強調のための重み係数を $\alpha_1$ 、負の場合(つまり立ち下がりの時)はこれを $\alpha_2$ とする。これらの重み付け回路321, 322の出力を切り替え回路33により切り替えて、加算器33に与えるようにしている。

【0025】これにより、図5に示すように、立ち上がりと立ち下がりとで異なるそれぞれ最適の高域強調量を付けた補正信号Sc(t)を得て、光学応答特性I(t)をより高速化することができる。

【0026】図6は第3の実施例の要部構成である。図6(a)が第2の実施例と異なる点は、高域強調量を変化させる制御パラメータとして、入力の変化だけでなく、入力レベルそのものをも含めたことである。これは、液晶の応答速度が入力電圧の変化だけでなく、電圧の初期値または変化後の電圧にも依存することを考慮して、より正確な高域補償を行うためである。

【0027】図6(b)は図6(a)をより一般化した実施例である。重み付け回路32の重み係数 $\alpha$ は、入力のフィールド間差分および入力レベルにより変化する。さらに図6(c)に示す実施例は、高域を持ち上げたい部分の周波数を高次のバンドパスフィルタBPF(またはハイパスフィルタHPF)1'により抽出して、その出力と入力レベルにより重み付け回路32の重み係数 $\alpha$ を制御する構成としている。この実施例によると、液晶の応答特性を補償する上でより適した高域強調フィルタとすることができる。

【0028】図7は第4の実施例の要部構成を示す。従来技術で少し説明したが、応答速度はセルギャップの二乗 $d^2$ に反比例している。つまり、セルギャップ $d$ を小さくすれば応答速度は速くなる。しかし、コントラストを高くとるために、 $\Delta n d / \lambda$ ( $\Delta n$ :屈折率の異方性、 $\lambda$ :入力波長)をモーガンの条件を満たすようにしなければならない。したがって最適なコントラストを得るために、R, G, Bによってセルギャップを変える必要がある。これは、マルチギャップと呼ばれる。この様な場合当然ではあるが、R, G, Bによって応答速度が異なるという問題が生じる。そこでマルチギャップに対応させるべく、R, G, Bでそれぞれ高域強調量を最

適に制御するようにしたのがこの実施例である。ここでは図6(b)の基本回路を3つ用いたが、他の実施例の基本回路3つを用いてもよい。

【0029】図8は第5の実施例の要部構成を示す。この実施例では、図6(b)の実施例の回路に加えて、液晶表示部5の液晶温度を検出する温度検出器6を設け、この温度検出器6の出力により重み付け回路32を制御するようにしている。

【0030】図9に示したように、液晶の応答特性には強い温度依存性があるだけでなく、立上がりと立ち下がりとで異なった温度依存性を示す。これは、立上がりは粘性 $\alpha$ の温度依存性に大きく影響されるのに対し、立ち下がりは粘性 $\alpha$ の温度依存性を分母の弾性定数Kの温度特性が緩和するように働くことに起因している。したがってこの実施例のように、液晶温度を検出してその出力に応じて高域強調パラメータである重み係数 $\alpha$ を変化させるように制御する事により、応答特性の最適補償を行うことが可能になる。

【0031】図10は、液晶の物性定数の温度依存性を示している。図に示すように液晶の物性定数は温度によって変化する。したがってこの物性定数の変化を検出することにより温度検出を行うことができる。同じパネル内の液晶を用いて温度検出ができるれば、そのパネルに最も適した温度補償ができる。

【0032】図11は、その様な液晶を用いた液晶温度検出器の構成例である。図10に示したように液晶の誘電率 $\epsilon$ は温度によって変化する。したがって誘電率の変化、つまり液晶容量CLCDの変化を外づけの容量CDによって電圧に変換して出力するのが、図11の温度検出原理である。つまり、図11の入出力の関係は、

$$V_{out} = V_{in} \cdot CLCD / (CD + CLCD)$$

と表されるので、液晶容量CLCDの変化を出力 $V_{out}$ の変化として検出することができる。

【0033】液晶温度検出法としてはこの他に、光検出器を用いて液晶のしきい値 $V_{th}$ の温度による変化を光量変化として検出する方法、マイクロプロセッサを用いてある一定時間毎に立ち上がり、立ち下がり時間を計算し、オーバーシュートのないような制御を常にフィードバックで行う方法等が考えられる。

【0034】図12は、第6の実施例の要部構成である。この実施例では、入力画像信号の動きを検出する動き検出回路8が設けられている。この動き検出回路8により検出された動き量に応じて、フィールド内とフィールド間の補間の重み付け量が決定されると共に、順次走査変換回路7において、時間軸圧縮によりインターレース信号(順次走査信号)に変換される。この順次走査変換された信号が液晶を実際に駆動する信号になるので、この信号が1フィールド期間つまり1画面の信号書き替え周期にどれだけ変化したかが、液晶の応答速度を決める重要なパラメータになる。

【0035】そこで、記憶回路1と差分器2により求まる1フィールド期間内の変化量に入力レベルと動き量に応じて変化する重み係数 $\alpha$ を掛ける重み付け回路32と加算回路31により構成される時間軸強調フィルタによって、順次走査変換信号が補正される。

【0036】図13は、動き検出回路8の具体的な構成例である。輝度信号の動きは、フレームメモリ11の入出力の差を差分器13により検出して、LPF14により1フレーム差分として検出される。色信号の動きはフレームメモリ11とフレーム遅延回路12の直列回路の入出力の差を差分器16により検出して、BPF17により2フレーム差分として検出される。これらの差分信号はそれぞれ絶対値検出回路15, 18を通り、最大値検出回路19により最大値が検出される。この最大値検出回路19の出力は伸長回路20を通り、デコーダ21を通って動き信号として出力される。伸長回路20は、速い動きに対して検出漏れがないように、2フィールドの動き情報をを利用して時空間フィルタをかけるために設けられている。

【0037】この様な構成により画像の動きが検出されるわけであるが、誤検出はやはりある。たとえば、静止画のノイズを動画として検出すると、図12の構成ではそのノイズを $\alpha$ 倍してしまうことになる。

【0038】この誤検出を救済するためには、たとえば重み係数 $\alpha$ のテーブルを、図14(a) (b) のように設定することが考えられる。図14(a)に示すように、動き量が小さい時はこれをノイズと判断して、高域強調をかけないようにする。実際に、動き量をフィールド間差分とした場合で、図14(a)の破線のテーブルと実線のテーブルで比較した結果、実線のテーブルの方がノイズが大幅に減少することが確認されている。

【0039】図14(a)のテーブルの場合、画像によっては、不連続点が目立つ可能性がある。したがって図14(b)に示すように段階的に理想の線に近付けるテーブルを用いることも考えられる。

【0040】図15は、図12の実施例において、図8の実施例と同様に液晶温度検出を行って、その出力に応じて高域強調パラメータである重み係数 $\alpha$ を変化させる制御を行うようにした実施例である。

【0041】ところで液晶表示部に場所によって温度ムラがある場合、一点の温度検出では最適温度制御ができない。この様な場合、液晶表示部の複数箇所の温度検出を行うことが有効である。

【0042】図16は、この様な観点から図15を改良した実施例である。この実施例では、液晶表示部5を4分割して、各小画面の4角の温度をスイッチ22により切り替えて検出する。スイッチ22は画面位置検出回路23によって制御される。この様にして検出される複数箇所の温度のなかから重み係数 $\alpha$ の制御データとして最適のものを用いる。同様の変形は、先の図15の実施例

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に対しても行うことができる。

【0043】なお、液晶表示部の4角の温度データをそのまま用いるのではなく、例えば図17に示すような基準となる温度ムラパターンを用意しておいて、端xeの温度がCT0になったら、距離x1での温度をCT1にするという予測を行うようにすることも有効である。

【0044】図18は、図12の実施例に対して更に、画像信号入力部に雑音除去フィルタ24を設けた実施例である。先に説明したように入力信号に雑音があると、誤検出によって雑音を增幅してしまう可能性がある。この実施例のように雑音除去フィルタ24を設けることによって、誤検出を少なくすることができる。この雑音除去が有効に働くならば、動き検出回路8を省略することもできる。先に説明した図1、図4、図8の実施例に対しても同様に雑音除去フィルタを入力端子部に設けることは有効である。

[0045]

【発明の効果】以上詳細に説明したように本発明によれば、時間軸フィルタを用いて入力画像信号の高域強調を行うことにより、液晶表示装置の応答特性を改善し、特に中間調表示での応答速度を高速化して、残像を低減した高画質の液晶TVを実現することができる。

### 【図面の簡単な説明】

【図1】本発明の第1の実施例の要部構成を示す図。

【図2】同実施例の動作を説明するための信号波形図。

【図3】同実施例の高域強調フィルタの特性を示す図。

【図4】第2のの実施例の要部構成を示す図。

【図5-1】同実範例の動作を説明するための信号波形図

【図6】本発明の第3の実施例の要部構成を示す図

【図7】本発明の第4の実施例の要部構成を示す図

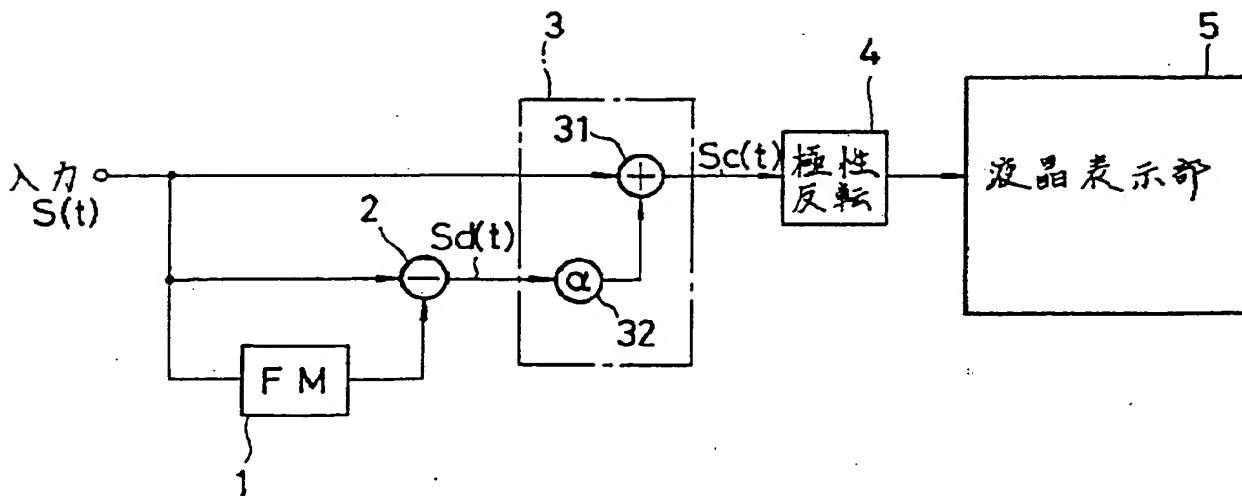
【图1】率先分心的第4号大脑沟的重要的脑膜血管，图。

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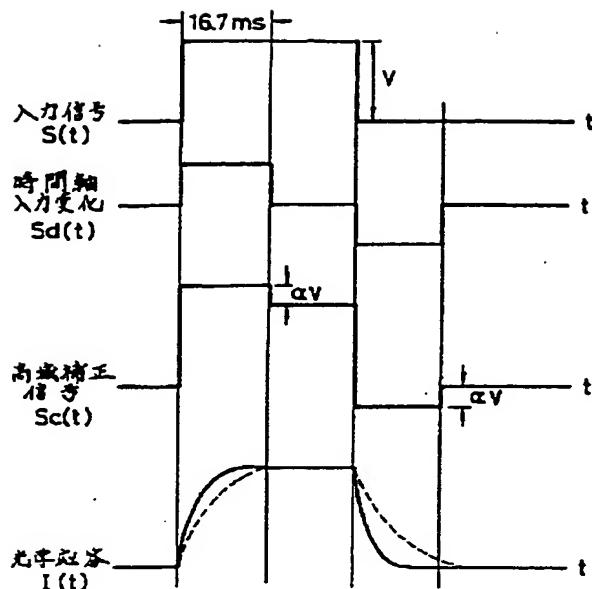
【図 8】本発明の第 5 の実施例の要部構成を示す図、  
 【図 9】液晶の応答速度の温度依存性を示す図。  
 【図 10】液晶の物性定数の温度依存性を示す図。  
 【図 11】液晶の温度検出器の構成例を示す図。  
 【図 12】動き検出回路を備えた実施例の要部構成を示す図。  
 【図 13】同実施例の動き検出回路の構成例を示す図。  
 【図 14】動き量と高域強調量の関係を示す図。  
 【図 15】図 12 の実施例に温度検出器を設けた実施例  
 10 の要部構成を示す図。  
 【図 16】図 15 を変形して複数箇所の温度検出を行う  
 ようにした実施例を示す図。  
 【図 17】温度制御のための基準温度分布を示す図。  
 【図 18】雑音除去フィルタを設けた実施例の要部構成  
 を示す図。  
 【図 19】液晶の応答速度を説明するための図。  
 【図 20】液晶の透過率の入力電圧依存性を示す図。  
 【符号の説明】  
 1 … 画像用記憶回路、  
 20 2 … 差分器（レベル変化検出回路）、  
 3 … 時間軸フィルタ回路、  
 3 1 … 加算器、  
 3 2 … 重み付け回路、  
 3 3 … 切替え回路、  
 4 … 極性反転回路、  
 5 … 液晶表示部、  
 6 … 温度検出器、  
 7 … 順次走査変換回路、  
 8 … 動き検出回路。

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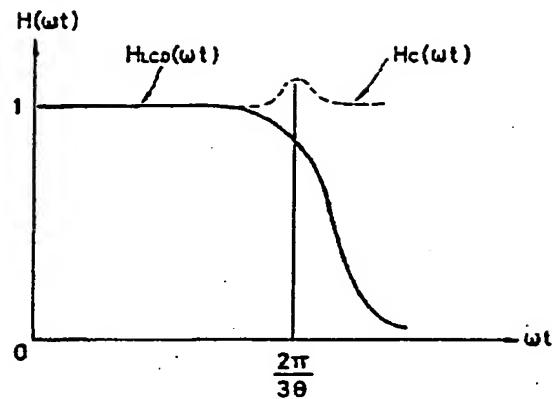
[图 1]



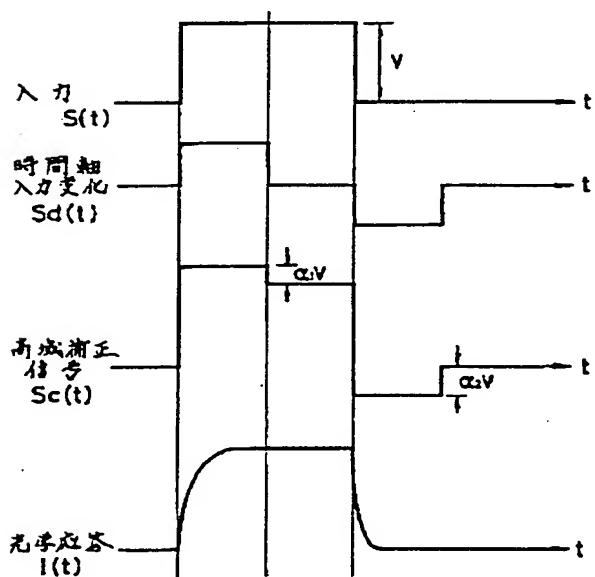
【図2】



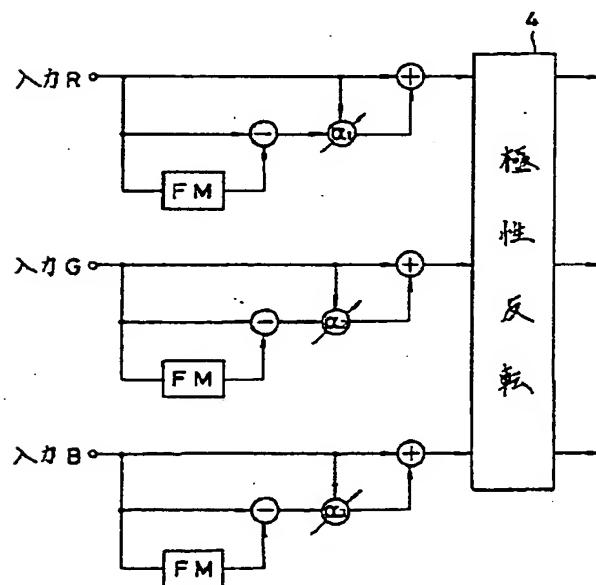
【図3】



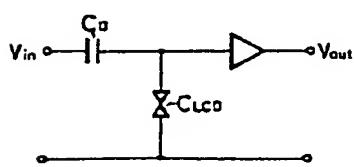
【図5】



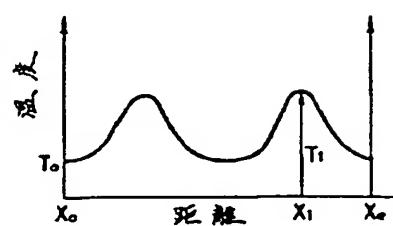
【図7】



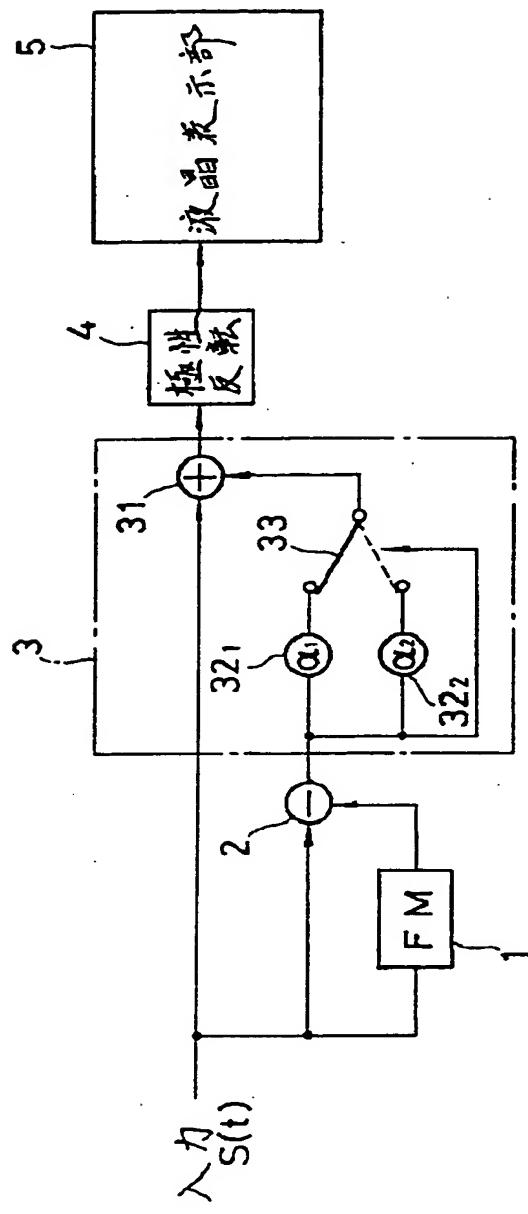
【図11】



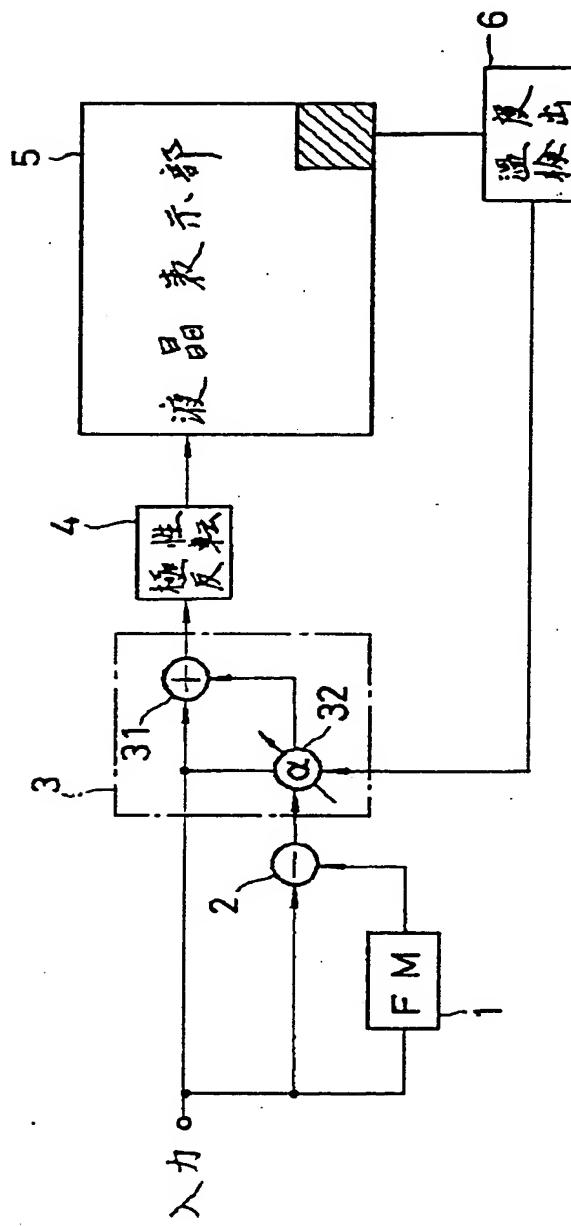
【図17】



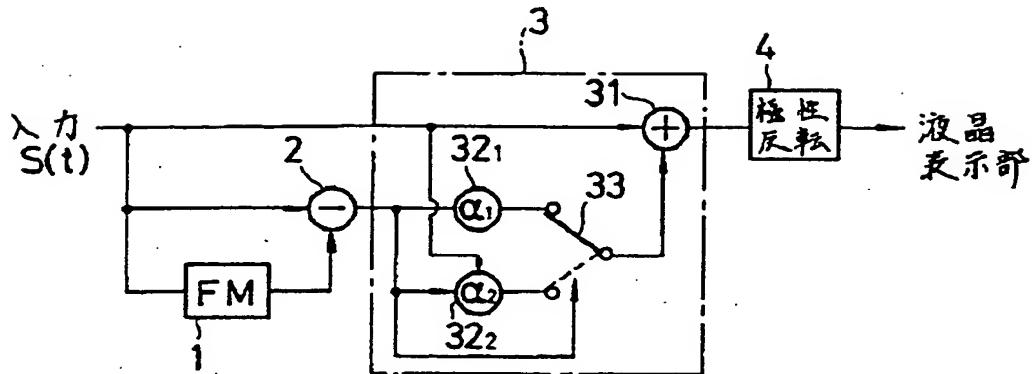
【図4】



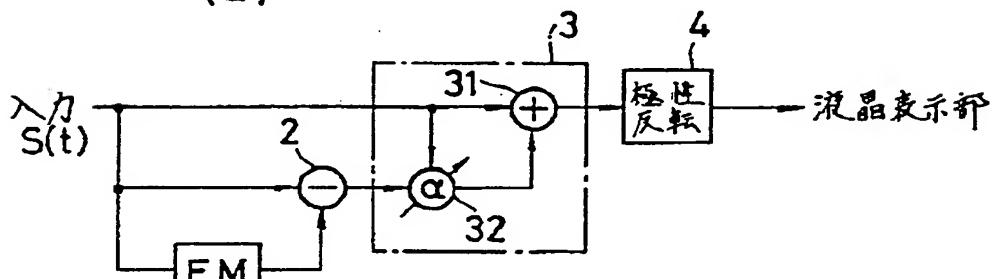
【図8】



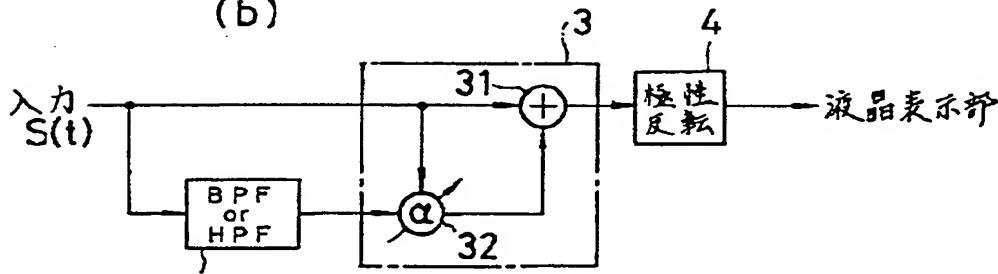
[圖 6]



(a)

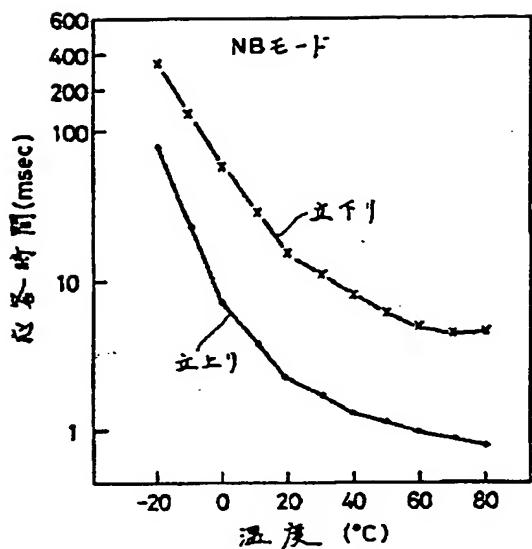


(b)

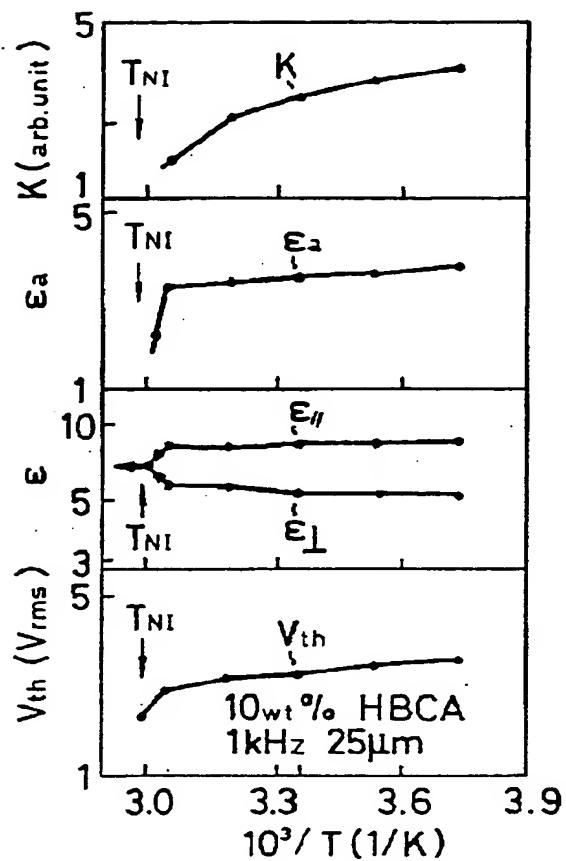


(c)

【図9】



【図10】



【図12】

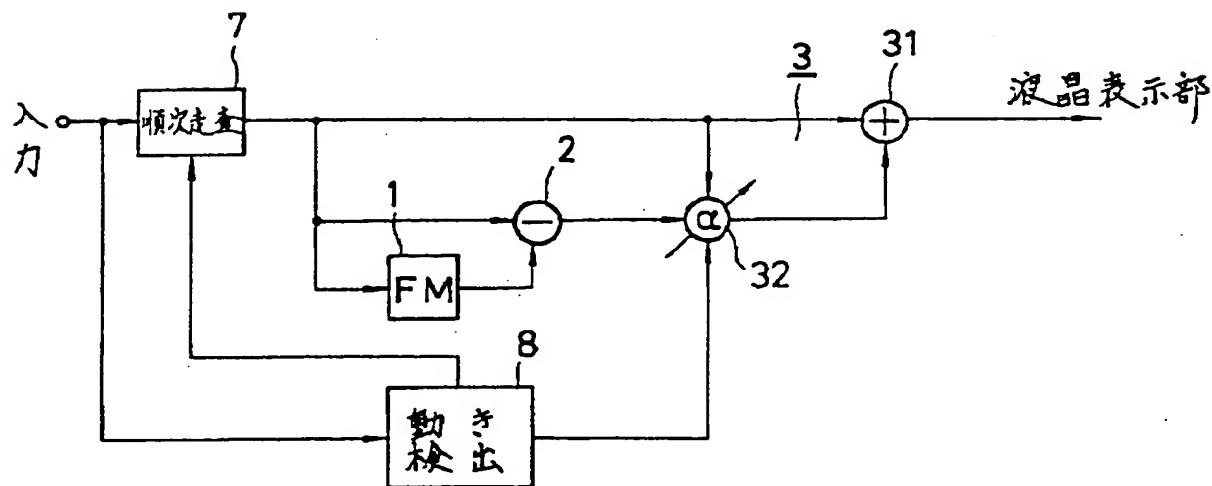
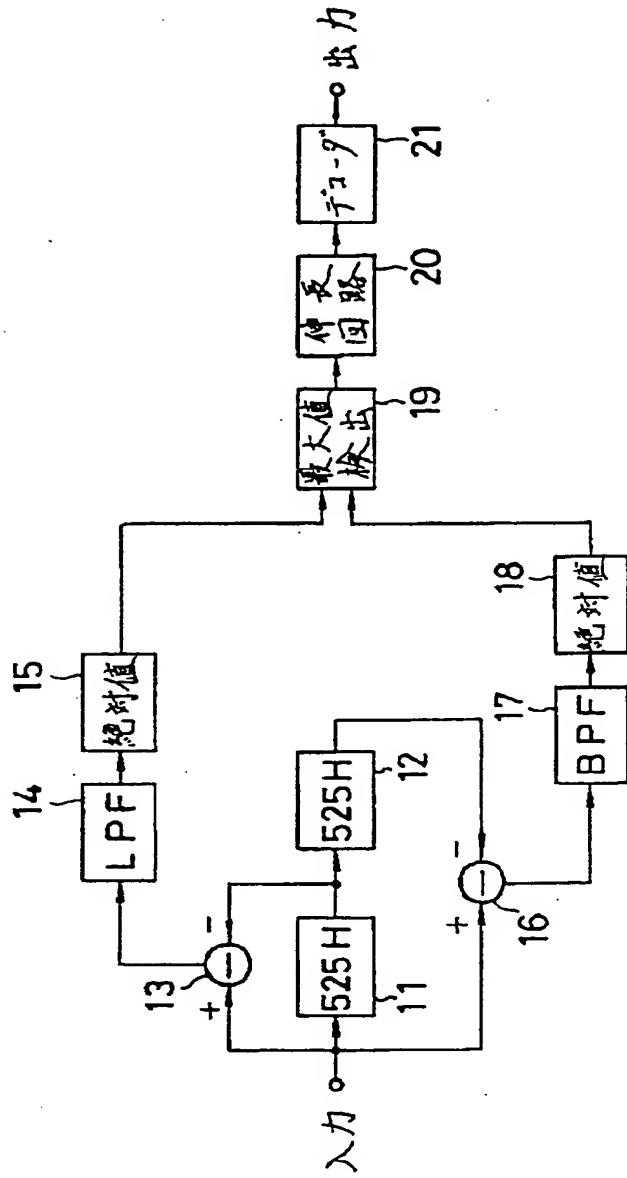
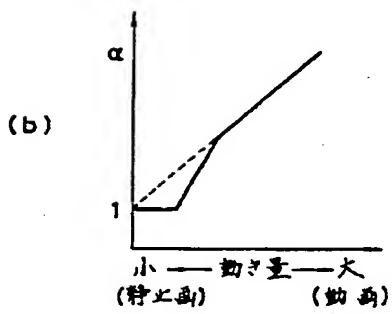
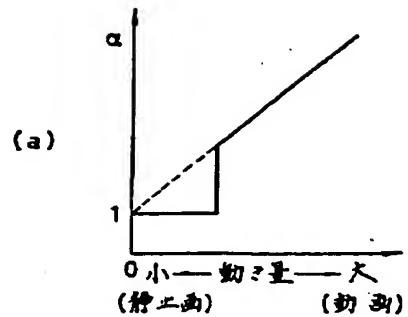


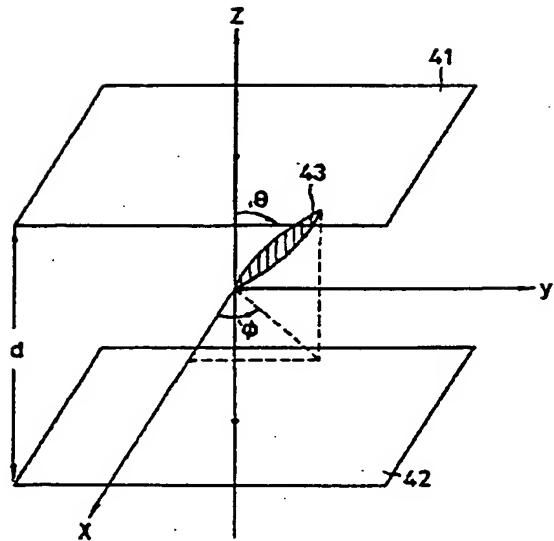
図13]



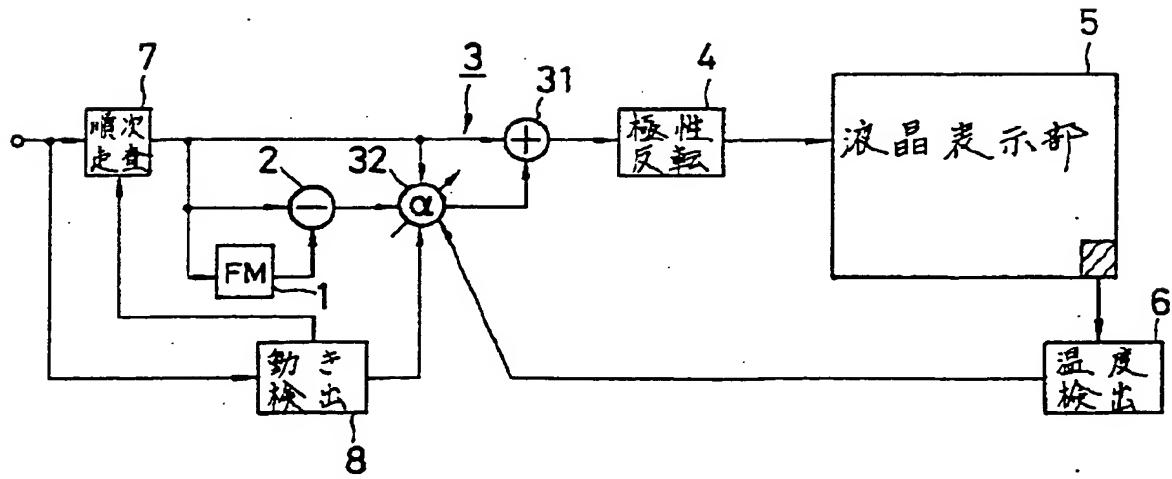
【図14】



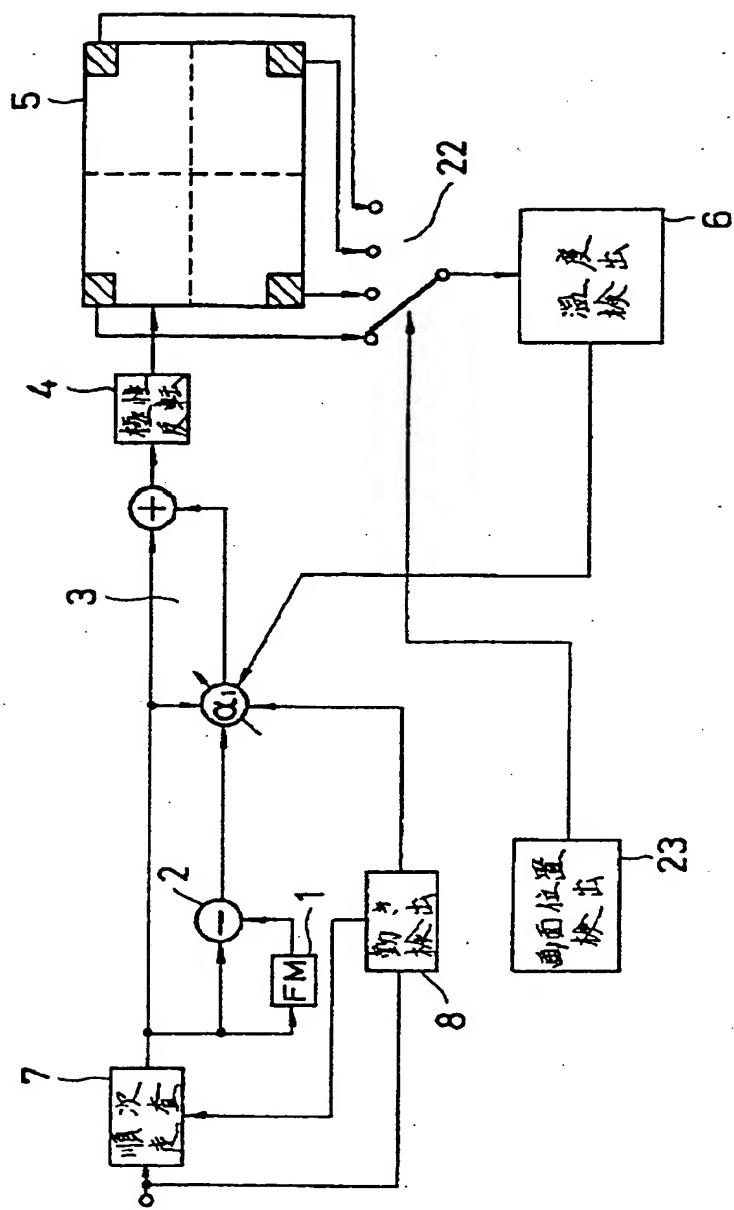
【図19】



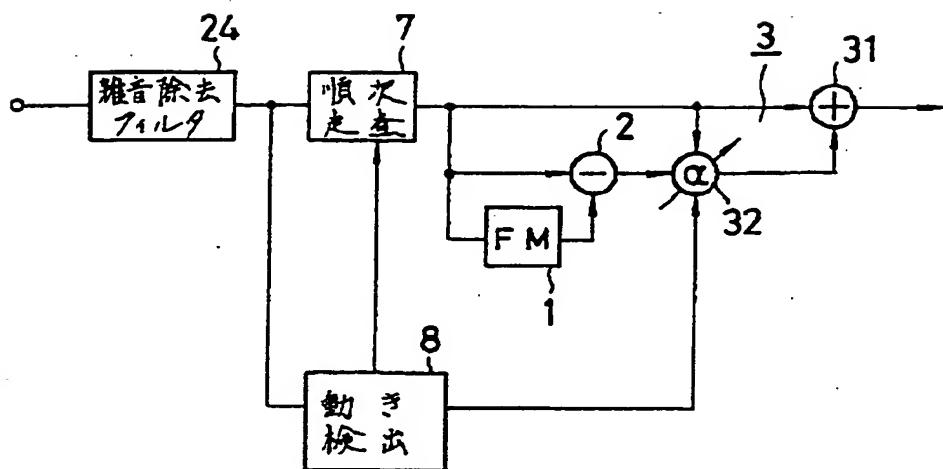
【図15】



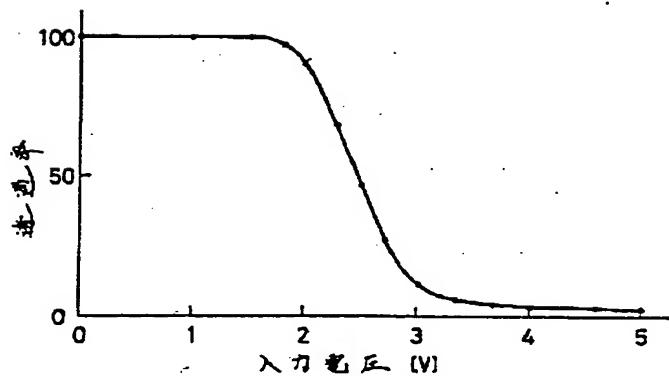
[図16]



【図18】



【図20】



DESC/OAT 55750 (45672)



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/820,021	03/28/2001	Takako Adachi	55,750 (45672)	5288

21874 7590 06/18/2003

EDWARDS & ANGELL, LLP  
P.O. BOX 9169  
BOSTON, MA 02209

EXAMINER

ZAMANI, ALI A

ART UNIT PAPER NUMBER

2674

DATE MAILED: 06/18/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

**COPY**

Notice of Abandonment	Application No.	Applicant(s)
	09/820,021	ADACHI ET AL.
	Examiner	Art Unit
	Ali A. Zamani	2674

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1.  Applicant's failure to timely file a proper reply to the Office letter mailed on 20 November 2002.
  - (a)  A reply was received on \_\_\_\_\_ (with a Certificate of Mailing or Transmission dated \_\_\_\_\_), which is after the expiration of the period for reply (including a total extension of time of \_\_\_\_\_ month(s)) which expired on \_\_\_\_\_.
  - (b)  A proposed reply was received on \_\_\_\_\_, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
  - (c)  A reply was received on \_\_\_\_\_ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
  - (d)  No reply has been received.
2.  Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
  - (a)  The issue fee and publication fee, if applicable, was received on \_\_\_\_\_ (with a Certificate of Mailing or Transmission dated \_\_\_\_\_), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
  - (b)  The submitted fee of \$\_\_\_\_\_ is insufficient. A balance of \$\_\_\_\_\_ is due.  
The issue fee required by 37 CFR 1.18 is \$\_\_\_\_\_. The publication fee, if required by 37 CFR 1.18(d), is \$\_\_\_\_\_.
  - (c)  The issue fee and publication fee, if applicable, has not been received.
3.  Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
  - (a)  Proposed corrected drawings were received on \_\_\_\_\_ (with a Certificate of Mailing or Transmission dated \_\_\_\_\_), which is after the expiration of the period for reply.
  - (b)  No corrected drawings have been received.
4.  The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.
5.  The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.
6.  The decision by the Board of Patent Appeals and Interference rendered on \_\_\_\_\_ and because the period for seeking court review of the decision has expired and there are no allowed claims.
7.  The reason(s) below:



Ali A. Zamani  
Patent and Trademark Office  
U.S. Patent and Trademark Office  
Washington, D.C. 20591-0000

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

<b>Interview Summary</b>	Application No.	CO <sup>7</sup> Applicant(s)	
	09/820,021	ADACHI ET AL.	
	Examiner	Art Unit	
	Ali A. Zamani	2674	

All participants (applicant, applicant's representative, PTO personnel):

(1) Ali A. Zamani. (3) \_\_\_\_\_.

(2) Davidid Collins & IDavid A. Tucker. (4) \_\_\_\_\_.

Date of Interview: 10 June 2003.

Type: a) Telephonic b) Video Conference  
c) Personal [copy given to: 1) applicant 2) applicant's representative]

Exhibit shown or demonstration conducted: d) Yes e) No.  
If Yes, brief description: None.

Claim(s) discussed: None.

Identification of prior art discussed: None.

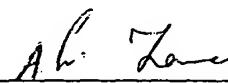
Agreement with respect to the claims f) was reached. g) was not reached. h) N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Examiner indicated that the case is abandoned.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

  
\_\_\_\_\_  
Examiner's signature, if required

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**NOTICE OF ABANDONMENT**

**COPY**



## **EDWARDS & ANGELL, LLP**

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**David G. Conlin**  
Direct Dial: (617) 517-5515  
E-Mail: dconlin@ealaw.com

December 5, 2002

United States Patent and Trademark Office  
Electronic Business Center  
2231 Crystal Drive; Suite 903  
Arlington, VA 22202

Dear Mr. Uranga:

Enclosed please find printed and disk copies of a spreadsheet detailing patent applications and issued patents which we would like to have connected to our customer number, 21874.

Please contact this office should you have any questions. Thank you for your attention in this regard.

Sincerely,

David G. Conlin

Enclosures

**Customer Number Submission**

**Please see highlighted case on marked page of attachment.**

**COPY**

## **EDWARDS & ANGELL, LLP**

---

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101 FEDERAL STREET  
BOSTON, MA 02110  
(617) 439-4444  
FAX (617) 439-4170

**David G. Conlin**  
Direct Dial: (617) 517-5515  
E-Mail: [dconlin@ealaw.com](mailto:dconlin@ealaw.com)

February 11, 2003

Mr. Tony Uranga  
United States Patent and Trademark Office  
Electronic Business Center  
2231 Crystal Drive; Suite 903  
Arlington, VA 22202

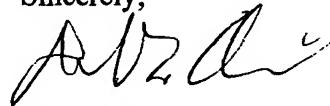
Re: Customer number 21874

Dear Mr. Uranga:

Further to our previous correspondence, enclosed please find printed and disk copies of a spreadsheet detailing patent applications and issued patents that we would like to have connected to our customer number, 21874.

Please contact this office should you have any questions. Thank you for your attention in this regard.

Sincerely,



David G. Conlin

Enclosures